TECNO SAVIOR

Matoshri College of Engineering & Research Centre, Nashik
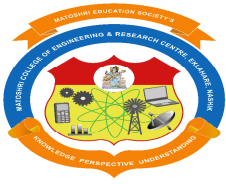
Vision

"To Establish Omnipotent Learning Centre Meeting the Standards to Evolve as a Lighthouse for the Society."

Mission

- Setting up state-of-the-art infrastructure
- Instilling strong ethical practices and values
- Empowering through quality technical education
- Tuning the faculty to modern technology and establishing strong liaison with industry
- Developing the institute as a prominent center for Research and Development
- Establishing the institute to serve a Lighthouse for the society

Quality Statement

"We, Matoshri College of Engineering & Research Center are committed to practice a system of Quality Assurance that inculcates quality culture, aiming at quality initiation, sustenance and enhancement of quality comprehensively ultimately leading the institute as Center of Excellence."

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

Technosavior

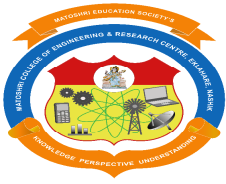## CHANGE DETECTION ANALYSIS USING GIS   Mrs. M. S. Aher

Land use Land cover is a vital component in understanding the relation of the human activities with the environment and therefore to maintain sustainable environment change detection is necessary. In this research an attempt has been made to study the changes in land use land cover in some parts of Aurangabad and Jalna districts. The study was carried out through Remote Sensing and GIS approach using SOI topo sheet, IRS-P6-LISS-III (2008) and Land Sat 7 ETM+ (2015). Land use Land cover changes have been detected by using image processing software EDRAS imagine 2013. Survey of India topo sheet and satellite images are used to perform land use land cover classification. GIS software is used to prepare the thematic maps. The seven year time period of 2008 -2015 shows the major type of land use change. Agricultural activities were increased from 18.28% to 46.54%, alternately fallow land was increased from 18.56% to 20.55% and built-up-land was increased from 1.03% to 3.98%. Water bodies and waste land have also experienced the change.

Land use Land cover (LULC) maps describe the vegetation, water and natural features on the land surface. Although the terms land cover and land use is often used interchangeably, their actual meanings are quite distinct. Land cover refers to the surface cover on the ground, whether vegetation, urban infrastructure, water, bare soil or other. Identifying, delineating and mapping land cover is important for global monitoring studies, resource management and planning activities. Identification of land cover establishes the baseline from which monitoring activities like change detection can be performed and provides the ground cover information for baseline thematic maps.

Land use refers to the purpose the land severs, for example, recreation wildlife habitat, or agriculture. Land use applications involve both baseline mapping and subsequent monitoring, since timely information is required to know what current quantity of land is in what type of use and to identify the changes from year to year.

Over the years, remote sensing has been used for land use land cover mapping in different parts of application of remotely sensed data made possible to study the changes in less time, at low cost and with better accuracy. Remote sensing and Geographic Information System (GIS) provide efficient methods for analysis of land use issues and tools for land use planning and modeling.

An investigation has been carried out in parts of Aurangabad and Jalna district of Maharashtra to detect the land use land cover changes. This area is facing severe drought, hailstorm and less rain fall since past years. Study area falls under the drought prone area of Aurangabad and Jalna districts and the agricultural activities are entirely dependent on monsoon. Looking the situation of area and conditions of villages Government of Maharashtra has started the implementation of the water conservation activities. The activities are implemented by keeping expected rainfall. It is believed that

1

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).
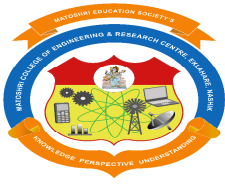
NAAC
ACCREDITED

Technosavior

these activities might have influenced on the land use/land cover patterns resulting in a possible impact on the environment.

Change detection analysis method is used to identify, describe and quantify differences between images of the same area at different times. Change detection is the pixel based comparison and thus, interprets the changes more efficiently. Data from two different images were compared using cross- tabulation in order to determine the changes for the periods from 2008 to 2015. With the help of ERDAS imagine 2013 change matrix was produced. The areal data of the overall land use/ land cover changes as well as losses and gains in each class between 2008 and 2015 were compiled.

The Land use Land cover categories such as water body, agricultural land, built up area, fallow land/ non agricultural land and grass land / waste land have been identified and mapped from IRS -P6 LISS III and Land Sat 7 ETM+ of 2008 and 2015. Due to the effective watershed management programmed in the study area water bodies during 2008 and 2015 are changes from 3.97% to 20.68%. People utilize the land for agricultural purposes. The area occupied by the agricultural land is about 18.28% (2008) and 46.54% (2015). This is due to the shifting of grass land waste land to the agricultural land. The area occupied by the grass land / waste land is decreased from 58.16 %(2008) to 8.25% (2015). Due to increase in water conservation techniques in study area there is increase in water bodies and agricultural land. Built up area is increased from 1.03% (2008) to 3.98% (2015).

The significant changes in the land use land cover during the study period between the years 2008 to 2015 recorded. The study revealed that the major changes occurred in water bodies, agricultural land and grass land/ waste land. The features named asGrass land / waste land indicated a decreasing trend where as the features like fallow land/ Non agricultural land indicated an increasing trend. The reasons attributed for this are due to the changes in the pattern of agricultural activity and increased in water conservation techniques. Ingeneral the land use/land cover data during the study period (2008-2015) of the study area indicated certain significant changes which may not show any significant environmental impact. However, these trends need to be closely monitored for the sustainability of environment in future. Built up area were found to occupy the lowest area compared to other land use categories.Change detection analysis brings out the actual land loss and land gain on fallow land / non agricultural land and agricultural land.

2

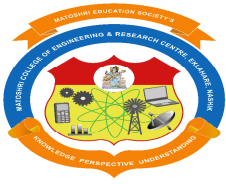*Matoshri College of Engineering and Research Centre, Nashik*
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

Municipal Solid Waste Management	Mr. N. B. Aher

M. C. E. R. C, Nashik

Municipal solid waste (MSW) includes household garbage and rubbish, street sweeping, construction and demolition debris, sanitation residues, trade and non-hazardous industrial refuse and treated bio-medical solid waste . As per the World Bank estimates urban India produces approximately 100,000 metric tons of MSW daily or approximately 35 million metric tons of MSW annually by the year 2000 . Quantity of MSW is increasing due to increase in population and rapid urbanization. Indian cities are generating eight times more MSW by 2006 than they did in 1947. Expected generation of municipal solid waste until 2025 in India is 700 gram per capita per day . The urban population of India is expected to grow to 45% of total from the prevailing 28%. Hence, the magnitude of MSWM problem is likely to grow to even larger proportions [7]. The typical rate of increase of MSW generation in Indian cites is estimated around 1.3% annually.

The quality and quantity of MSW generated by a particular community varies according to their socio-economic status, cultural habits, urban structure, population and commercial activities etc. Planning, designing and operation of municipal solid waste management system can be done on the basis of composition and the quantity of MSW generated. In general Indian MSW contains more organic material and less hazardous material than western countries like USA, Canada etc . The quantity of waste paper in India, is much less, as even the quantity thrown away is picked up by people for its use as a fuel and also for packaging of materials / food sold by road side hawkers. The plastics, rubber and leather contents are lower than the paper content, and do not exceed 1% except in metropolitan cities. The metal content is also low, (less than 1%). These low values are essentially due to the large scale recycling of these constituents .Paper is recycled on a priority basis while plastics and glass are recycled to a lesser extent Management of municipal solid waste is becoming difficult due to its varying quality and increasing quantity. According to Municipal Solid waste Rule 2000 In India MSWM is responsibility of local administrative body (LAB). Elected representatives of the city/town govern LAB's. Cities and towns in India are classified according to population. According to census of India 2011 cities/town are classified as per population as Class I Town Population of 100000 and above, Class II Town Population of 50000 - 99999, Class III Town Population of 20000 – 49999, Class IV Town Population of 10000 – 19999, Class V Town Population of 5000 – 9999, Class VI Town Population below 5000. Cities having population 10 lakh and more are considered as metro cities. In India availability of resources needed for MSWM largely depends on status of the local administrative body as per the above classification. Municipal solid waste management includes collection, storage, transportation and disposal of solid waste. Poor collection and inadequate transportation leads to heap of MSW at many places, which causes health and environmental

3

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
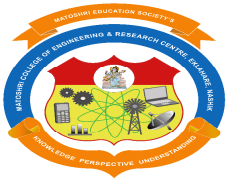*Contact: 0253 2406600,612*

problems. Governments world over are making efforts to improve solid waste management in their respective countries

The Municipal Solid Waste (Management and Handling) Rules 2000 have stipulated steps to be taken by all local administrative bodies (LAB) for better MSWM in India. Each LAB must provide the infrastructure and services with regard to collection, storage, segregation, transport, treatment, and disposal of MSW. According to the MSWM rule 2000 the urban development departments of the respective state governments are responsible for enforcing the provisions of the rules in metropolitan cities.

The district magistrates or deputy commissioners of the concerned districts are responsible for enforcing the provisions within the territorial limits of their jurisdictions. The state pollution control boards are responsible for monitoring compliance with the standards on air, water, noise pollution. They must also monitor compliance with compost quality standards and incineration standards as specified in the rules. MSWM rule 2000 gives all aspects of MSWM from collection to disposal. Collection of Solid Waste: MSWM-2000 prescribes collection of MSW at household level by using methods such as door-to-door collection or collection from community bins to prohibit littering and proper collection of MSW. Optimal schedule for collection should be prepared by minimizing the transportation cost in complaisance with environmental constraints. Arrangement for collection of MSW from slums and commercial areas are to be done separately. Segregation of waste at source must be encouraged. Separate collection of horticulture waste, demolishing waste along with general MSW should be encouraged. Asnani [21] observed that the major issues related to collection of MSW are lack of awareness and lack of adequate manpower for door to door collection.

Secondary Storage and Transport of Waste: According to MSW-Rule 2000 municipal authority should provide secondary storage for total MSW generated. Transfer of MSW from secondary storage to disposal site should be done at regular interval. MSW should be covered during transportation to avoid exposure and spilling in atmosphere. Transportation of waste from community bins should be done before over overflow. Asnani observed that most municipalities have scarcity of transportation vehicles for MSW. Waste Treatment: MSW collected should be segregated before recovery and recycling done. According to Rule MSW 2000 biodegradable waste is processed by composting, vermi -composting, anaerobic digestion, or any other appropriate biological process for stabilizing waste. According to composition of waste incineration with or without energy recovery may also be suggested. Lack of technical knowledge and financial constraints of municipalities are leading to improper treatment of MSW in India.

Solid waste management is one of the most challenging issues in metro cities/class I towns. They are facing serious pollution problems due to the generation of huge quantities of solid waste.. Different cities also show increase in generation of solid waste with increase in population and
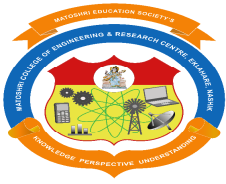
4

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

urbanization in India. During the year 2004-05, CPCB through NEERI, conducted survey in 59 cities (35 Metro cities and 24 State Capitals) and estimated 39,031 Tons per day MSW generation in these 59 cities/towns. The survey conducted by the central institute of Plastics Engineering and technology (CIPET) at the instance of CPCB has reported generation of 50,592 tons of MSW per day in the year 2010-11 in same 59 cities. These results show that generation of MSW has increased by 77.1% from 2005 to 2011 in metro cities/state capitals. As reported by SPCBs / PCCs (during 2009-12) and CPCB it is found that about 48134 MT/ day waste is generated from class-I cities. As per studies conducted by Tata Energy Research Institute, higher income group generate more solid waste than middle and lower income groups. For example, the lower income groups in New Delhi generate less than 1/3rd of solid waste than their higher income counter parts.

Analysis of MSW on wet weight basis from Metro cities/Class I cities at generation and collection point shows large organic fraction (40–60%), ash and earth (30–40%), paper (3–6%) and plastic, glass and metals (each less than 1%). The C/N ratio ranges between 20 and 30, and calorific value ranges between 800 and 1000 kcal/kg. The characterization study of waste collected from waste disposal sites reveals that, parameters of waste viz. pH, moisture content, organic matter, organic carbon and NPK were found in the moderate range . It is also reported that the MSW generated from residential areas comprises predominant portion of degradable material as compared to non-degradable waste. Metro cities/class I towns have well defined system for MSW collection, transportation, and disposal/composting. Cities are divided into different wards for collection of MSW, as it becomes convenient to handle[34]. The community bin collection system is the main practice used for waste collection. In this system, residents deposit their waste into the nearest community bins located at street corners at specific intervals [26]. In the other prominent practice MSW from source is collected by waste collecting persons then transfer it to the community bin. MSW is transferred from community bin to sanitary landfill site. Rag pickers can be seen at waste collection and disposal points . Rag pickers collect resalable/recyclable waste from the MSW hence very vital component of existing MSWM. Most municipalities do not provide proper disposal and treatment of MSW thus substantial part of the municipal solid waste generated remains unattended and grows in the heaps at poorly maintained collection centers. Due to the absence of adequate storage capacity for generated refuse and poor discipline among the generators, waste is also continually dumped on the road. MSW along the road sides are uncovered which causes health hazards and environmental harms.

Many municipalities have involved non-government organizations (NGOs) for collection and transportation of waste, which has led to improvement in local street cleanliness Different types of vehicles, varying from bullock carts to compactors, ordinary trucks, tractor and trailers, dumper placers, and tippers, are used for waste transportation. MSW collected is transferred to transfer stations before it is sent to final disposal site. However, transfer stations are in place in only few metropolitan
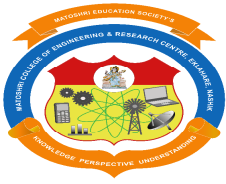
5

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

cities [1]. For effective solid waste management in a city, the desired strength of workers is 2–3 workers per thousand persons, which has been indicated as adequate based on earlier studies carried out by NEERI in more than 40 Indian cities. However, this number may change based on local conditions. For MSWM, every municipal agency can decide the strength of workers by considering the productivity of workers, which can be considered to be 200–250 kg/worker/8 hr shift [26]. Due to growing population and urbanization, municipal bodies are facing financial crunch and can no longer cope with the demands. The limited revenues earmarked for the municipalities make them ill equipped to provide for high cost involved in the collection, storage, treatment and proper disposal of waste. Studies indicate many deficiencies in MSWM of these cities. These deficiencies include improper collection of waste, vast variation in quantity of waste thus inadequate storage facilities available, improper routing and maintenance of vehicles used for transportation. It is leading to open dumped of waste at low line areas at the out skirts of these cities. Open dumping of garbage facilitates breeding of disease vectors such as flies, mosquitoes, cockroaches, rats and other pests .

There is no or less sanitary land fill sites at available these cities . In metropolitan cities like Bangalore, Hyderabad, Ahmedabad, and Kolkata (13 cities total), compost plants have been established and commissioned by private agencies. The plants have installed capacity in the range of 40–700 tonnes/day. However, the plants in operation are underutilized for various reasons; the major reason is the poor quality of compost resulting in reduced demand from the end users. The present system of MSWM in cities is not satisfactory based on MSW(M & H) Rule 2000. There is need to implement MSW (M & H) Rule 2000 in an integrated manner. More emphasis needs to be laid on segregation and collection of waste at door step. Segregation of recyclable material from mixed waste not only is tedious but also wasteful, therefore the residents should be sensitized towards the importance of segregation of wastes at source. Rather than considering the municipal solid waste simply as residue to be thrown away, it should be recognized as resource materials for the production of energy, compost and fuel depending upon the techno economical viability, local condition and sustainability of the project on long term basis.

Many researchers observed that the MSW generation rates in small towns are lower than those of metro cities, and the per capita generation rate of MSW in India ranges from 0.2 to 0.5 kg/day.Quality of MSW generated from these towns is different from that of MSW generated from Class-I towns and metros. According to survey conducted by Tata Energy Research Institute, composition of MSW from medium and small scale towns contains biodegradable waste (50 – 65%) and non-biodegradable waste (35 – 50 %). This is indicating that there is higher biodegradable waste in MSW of class-II and class-III towns. It is reported that the organic content of these towns changes significantly depending on the geographical location of the town. MSW of these town contains approximately 11% paper and cardboard, 40% organic waste, 34% non biodegradable and 14% plastic

6

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
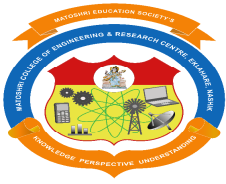Recognition of 2(F)/12(B) from University Grant Commission (UGC).

Technosavior

waste in Gujarat state . Most of class II/Class III towns do not have specific mode of collection, transportation, and disposal (CPCB, 2004). Some of these towns are developing transfer stations for intermediate segregation of the solid waste . The non recyclable waste is to be disposed in sanitary landfills sites as per MSWM-2000 rules. However, MSW is mostly thrown away at road sides or filed at the out skirts of the towns which undergo natural composting. The garbage is generally dumped and burned openly. Solid waste management is given low priority and budget, which make decision-making process slow. It has become more difficult due to lack of awareness of the rules and regulations, as well as environmental concerns with poor resources, have created a chaotic situation. Due attention is not paid to MSWM of these towns by the research community. It is desirable to evolve suitable strategy to deal with MSWM of class-II and Class-III towns. Some attempts are noted to develop mathematical models to forecast the quality and quantity of the MSW. It is also necessary to develop optimal operating strategy for MSWM in these towns.

In surrounding villages of class IV towns farming is major occupation of population. These towns in general have agricultural economy. MSW generation in these towns and nearby villages is varying with urbanization and population growth. We have studied municipal solid waste management in small-scale towns along with their surrounding villages located in the state of Gujarat- India. We found that average waste generation is 0.41Kg/capita/day from small-scale towns while 0.08kg/Capita/day waste is generated from villages. In rural area, people generally do not use plastic or metal containers to keep segregated waste as biodegradable and non-biodegradable . The total quantity of waste generated on day to day basis in each of the villages is considerably low. The composition of waste for small-scale towns was found to be 48% decomposable, 30% recyclable and 22% inert material. In the surrounding villages waste has approximately 73% decomposable, 20% recyclable and 7% inert materials. MSW for villages contain more of biodegradable. The general practice is to decompose this waste along with farm waste and reuse the same as fertilizer. The major problem in handling SW in these villages is collection transportation and disposal due to very low quantity of waste generated on daily basis. According to preliminary study done by the authors for the state of Gujarat, India found optimization of collection of waste for small-scale towns and village around by formation of clusters reduces MSWM cost up to 30 to 40%. It is also found that fixed costs like land and construction cost is very high when segregation sites are constructed at each source village while operating cost increases when cluster is formed. Operate one segregation site for a small town and cluster of villages is observed to be technically feasible and convenient from management view point.

Due to financial constrain, management inefficiency, manpower deficiency and less political will are found to be major difficulties with respect to MSWM in small scale towns and villages. Integrated waste management is to be explored to deal with waste generated from small-scale towns

7

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

Technosavior

and surrounding villages. MSWM of these small semi urban areas have not received their due attention from the researchers. Optimal integrated management of solid waste is an interesting area to be explored in future. Solid waste management for metro/large cities is different from that of small-scale towns and village surrounding them. In metro/large cities waste collection and segregation can be done at different places as per zoning according to socio-economic, commercial-residential area, industrial area etc. waste cumulatively collected can be segregated and disposed as required which will give economical option as it requires less manpower and other amenities (United Nations Environment Program, 2009). Integrated municipal solid waste management must be done to ensure the safe and environmentally sound disposal of waste In developing country like India where 71% of population resides in small scale towns and villages (census, 2011) interface between small scale towns and their surrounding villages should be done for better MSWM. Villages generate very small quantity of waste, which becomes difficult as well as financially not viable to manage at individual villages. Moreover, major portion of waste generated from villages is biodegradable in nature. Hence, quantity of disposable waste reduces further. Hence, it is advisable to explore the integrated MSWM strategy that is exclusively developed for such scenario. Overall, the deficiencies in MSWM are primarily caused by apathy of municipal authorities, lack of community involvement, lack of technical knowhow, and inadequate financial resources

Municipal solid waste generated depends on population climate, urbanization, socioeconomic criteria etc. Overall MSWM practices adapted in India at present are inadequate. It is also noted that efforts are made to improve MSWM in major cities but due attention is not paid for MSW of medium and small-scale towns. The current regulations (MSWM rules, 2000) are very stringent. Many deficiencies are identifying in the implementation of policy. Non compliances in MSWM are largely due to lack of training, financial constrains, lack of proper planning and leadership. For developing country like India having 71%, population residing in small-scale towns and villages proper waste management policy should implement in these areas. Optimization studies should be carried out to explore the feasibility of integrated waste management through clustering of small towns and their surrounding villages for better MSWM.

8

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC
ACCREDITED

Technosavior

Earth as a planet	Mrs. A. B. Gaikwad

Earth, Our home planet, is a World unlike any other. The third planet from the sun. Earth is the only place in the known universe confirmed to host life. With a radious of 3,959 miles, Earth is the fifth largest planet in our solar system. It's smaller than the four gas giants- Jupiter, Saturn, Uranus and Neptune-but larger than three other rocky planets, mercury, Mars and Venus.And it's the only one known for sure to have liquid water on its surface.

Image 1: Earth

Image 2: Solar system

- Age-4.543 billion years.
- Natural satellite moon.
- Four main layers.
- 3rd planet from sun.
- 5th largest planet in solar system.

Earth has a diameter of roughly 8,000 miles (13,000 kilometres) and is round because gravity pulls matter in to a ball. But it's not perfectly round. Water covers roughly 71 percent of earth's surface, and most of that in the oceans. About fifth of earth atmosphere consist of oxygen, produced by plants.
Earth's formation and evolution.Scientists think Earth was formed at roughly the same time as the sun and other planets some 4.6 billion years ago, when the solar system coalesced from a giant, rotating

9

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC
ACCREDITED

Technosavior

cloud of gas and dust known as the solar nebula. As the nebula collapsed because of its gravity, it spun faster and flattened into a disk. Most of the material was pulled toward the centre to form the sun. Other particles within the disk collided and stuck together to form ever-larger bodies, including Earth. Scientists think Earth started off as a waterless mass of rock.

Granite rock- Civil Engineering uses., Avhad Vrushali,T.E. Civil

Granite is a coarse grained igneous rock composed mostly of quartz, alkali feldspar and plagioclase. It is common in the Earth's continental crust, where it is found in various kinds of igneous intrusions. These range in size from dikes only a few inches across to batholiths exposed over hundreds of square kilometres.
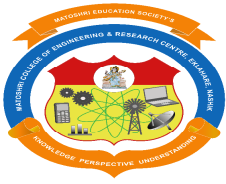
Physical Properties of Granite

- Granite is amassive, unstratified and dense, therefore it is very strong and competent.
- Granite has an interlocking texture, which keeps minerals firmly held and this cohesion contributes greater strength.
- Granite is either equigranular or has porphyritic texture.
- Since granite is massive and formed from melt it is neither porous nor permeable.So no saturation or percolation by water is possible.

Granite having pleasing color occurrence

- Rich in Silica- Resistant against weathering.
- Rich in minerals-Resistant against Abrasion.
- Presence of mural joints-easy for quarrying.
- Having pleasing color occurrence-decorative.
- Easily available.
- Resistant to fire and frost –minerals.
Uses of Granite in civil engineering

10

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

Technosavior

- Granite has good compressive strength i.e.175.00 N/mm^2
- Granite stone is widely used in flooring of houses, in public buildings and in commercial buildings, granite used on walls.
- Granite is also used on monuments.

REUSE OF CIGARETTE BUDS FOR MANUFACTURING BRICKS

Rutuja Shinde B.E.Civil

CBs accumulate in the environment mainly due to the poor biodegradability of the cellulose acetate filters. CB filters release a range of toxic chemicals as they deteriorate. CBs are carried by storm water into watercourses and ultimately the ocean where the chemicals they contain pose a risk to the organisms of both freshwater and marine environments. Land filling and incineration of CB waste are not, universally, neither environmentally sustainable nor economically feasible disposal methods. Even when correctly binned and sent to landfill far from natural waterways, CBs remain an environmental hazard. Also, land filling of waste with high organic content and toxic substances is in general becoming increasingly costly and difficult. Incineration of CBs is also a seemingly unsustainable solution as emissions from the burning waste contain various hazardous substances. Recycling CBs is problematic because there are no easy mechanisms or procedures to assure efficient and economical separation and recycling of the entrapped chemicals. An alternative could be to incorporate CBs in a sustainable composite building material such as fired bricks. Brick is one of the most accommodating masonry units as a building material due to its properties. Attempts have been made to incorporate waste in the production of bricks; for instance, the use of rubber, limestone dust and wood sawdust, processed waste tea, fly ash, polystyrene and sludge. Recycling of such wastes by incorporating them into building materials is a practical solution to the pollution problem. In addition, adding carbonaceous industrial wastes has also been demonstrated to be an efficient and environmentally advantageous way of reducing fuel use for brick-making.

Cigarette buds accumulate in the environment mainly due to the poor biodegradability of the cellulose acetate filters. CB filters release a range of toxic chemicals as they deteriorate. CBs are carried by storm water into watercourses and ultimately the ocean where the chemicals they contain pose a risk to the organisms of both freshwater and marine environments. A large amount of CBs are produced worldwide yearly. The insufficient collection & inappropriate disposal of wastes poses risks to human health & environment. Over the next few decades, globalization, rapid urbanization & economic growth in the world are tending to further deteriorate to this situation. We can take some of the results from a study on recycling CBs into fly ash bricks. For this study we can use the tests like flexure strength, water absorption & compressive strength.

11

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

The Technology behind Face Unlocking in Smartphones   Ms. Surabhi Pagar

What is Facial Recognition Technology?

Facial recognition technology is a part of biometric technology that identifies a person by face. It is also described as Biometric Artificial Intelligence, which is used to capture a person's facial texture and facial recognition such as eye retina, nose, face shape. It is used for facial recognition in videos, photos, or real-time. Facial Recognition has been a great help for the security department to identify criminals based on the video footage.

Read developments about 5G wireless Technology and what measures to take to prevent cybercrime.

Which Face Unlocking Technology is used in Smartphones?

- **Android Basic Facial Technology:** Android operating system introduced face unlocking from its "Ice Cream Sandwich" version (Android 4.0) in 2011. The main drawback of this face unlocking technique was that it used to store only 2D images so that it was very easy for someone or thief to fool the system and unlock the phone easily. As this technique was not fully efficient so users used this option along with PIN or password. Surprisingly Google has discontinued the face unlock feature
with Android 10 release due to security reasons.

Samsung Iris Technology: Iris scanner in Samsung device works based on the retina of eyes, just as human fingerprints are unique, the retina of the eye is also unique and no one can copy it. Samsung launched the Iris technology in its flagship devices Galaxy Tab Iris, Galaxy S7, and S7 Edge. Because earlier a normal front-facing camera could not scan the retina of the eye, Samsung gave a special infrared narrow focus camera to its flagship smartphone so that it could easily scan the retina of the eye. One disadvantage of the Iris technology is that it generally requires close proximity to camera, which can cause discomfort to eyes for some.

12

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).
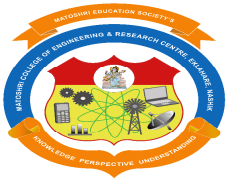
NAAC ACCREDITED

Technosavior

- **Apple Face ID**: Face ID is a type of facial recognition technology that the Apple company has designed and developed and started using in iPhone X, XS MAX, and iPad Pro (3rd & 4th Gen.) After introducing 3D facial recognition technology in 2017, Apple has continued using it in every new iPhones and iPads. With face ID introduction, Apple decided to discontinue the other biometric authentication, touch ID from 2017 in iPhones and iPads.

Here's how to set up Face ID:

1. Tap Settings
2. Tap Face ID & Passcode
3. Enter the Passcode (if prompted)
4. Tap Enroll Face (Under Face ID)
5. Tap 'Get Started' & follow the on-screen prompts
6. You will be asked to position your face within the frame
7. Move your head around so that it is scanned from all the angles

When setting up Face ID, you'll need to move your head around slowly so that Face ID can fully recognize your face. The setup process will take two scans of your face and then that's it.

13

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

Technosavior

Motion Design: How motion Graphics Influence User Experience,
Ms. Manisha Waghmare

Animation in web and mobile interfaces has been an issue to consider and discuss in recent years. Let's review some insights on the impact that motion design can have on user experience.

What Is Motion Design?

Many people are unaware of what precisely the term 'motion design' means. Let's shed a little light on it. First of all, the term 'motion design' is a short form for 'motion graphic design.'

As the name suggests, it is made of three elements: motion, graphics, and design. It is a combination of graphics that are moving in space and time.

As technologies continue to create innovative solutions in the world of experiential design, motion design is becoming more and more common. It was initially used as an application in film making and video production through the use of animation and visual effects. Some of the most common examples of motion design are:
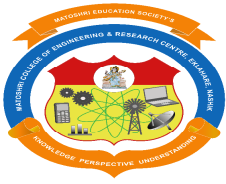
- animated films,
- videos,
- animated text,
- web-based apps.

Designers use a variety of software and other tools to create motion graphics. One of the most popular tools used by motion graphic designers is Adobe After Effects, which allows for creating and modifying graphics with an added element of time. Adobe Flash is also used to create motion design for web-based applications. Other professional motion graphics tools include Maxon Cinema 4D and Softimage.

A typical motion designer should be trained in graphic design and should be an expert in integrating the elements of time, sound and space into the existing model. Most motion designers have a film or animation background which makes the job even more comfortable.

In short, motion graphics include everything you see on the TV at the beginning of a news program, cartoons, character animations, animated typography, explosion scenes in movies and other visual effects. Almost anything that wasn't shot on camera and isn't considered special effects can be categorized as motion graphic design.

So, whether it is combined into a real-life video or a whole series of moving graphics, it is considered to be motion design.

14

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

Why is Motion Graphics Design Important?

Thanks to social media, humans are now consuming a massive amount of content every day. People scroll through their social media news feeds to find something eye-catching and search for easily digestible information.

According to research by MIT, a person can process visual information in as little as 13 milliseconds which proves that the human brain process information presented through visuals much more easily. Another factor is that many people consume social media content while their phones are muted. So, the need to communicate your message through only visuals is even more critical in today's world.

This is why marketers all over the world are using motion graphics to capture their audience's attention successfully.

Here are some techniques in which marketers can use motion graphics to fulfill all their communication needs:

- **Traditional ads:** Marketers can use motion graphics in online videos or television commercials to showcase their products.
- **Promo videos:** All sorts of editorial or advertorial videos such as viral videos, case studies, testimonials, user reviews are included in this category.
- **Explainer videos:** Most people use motion graphics in explainer videos. They include introductions to new products or services, overviews, business processes and tutorials.
- **Social media videos:** Another popular form of motion graphics include social media videos which are created to engage followers on social platforms like Facebook, Instagram, Snapchat, YouTube, etc. According to research by Tubular Insights, 64% of consumers are convinced to purchase a product after watching a video on social media.

15

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC
ACCREDITED

Technosavior

Pattern Recognition	*Ms. Harshala Antapurkar*

Humans and animals learn with the help of the senses. Learning helps in identifying and recognizing patterns around us. The process of pattern recognition involves matching the information received with the information already stored in the brain. Making the connection between memories and information perceived is a step of pattern recognition called identification.

What is a pattern?

A pattern is some phenomenon that repeats regularly based on a set rule or condition.

Recognizing Patterns:

Pattern recognition requires the repetition of experience. All discoveries and inventions to date are a result of the pattern recognition skills of humans. Humans have a tendency to see patterns everywhere. They are important when making comparisons, judgments, and acquiring knowledge.

Finding patterns is extremely important. Patterns make our task simpler.

Finding and understanding patterns is crucial to mathematical thinking and problem-solving.

Let's take the simple example of the sum of numbers from 1 to 10, which is 55.

$1+2+3+\ldots+10 = 55$

Now, the sum of 11 to 20 is $10 \times 10 + 55 = 155$

And similarly, the sum of 21 to 30 is $20 \times 10 + 55 = 255$.

Types of Patterns:

Logic, number, sound, image, and word patterns are all around us. Logic patterns help us classify similar objects, while number patterns help us predict a sequence. Word patterns help us make sense of language. Here is an example of a logic pattern.
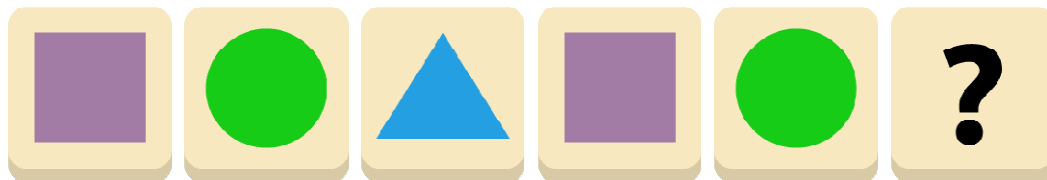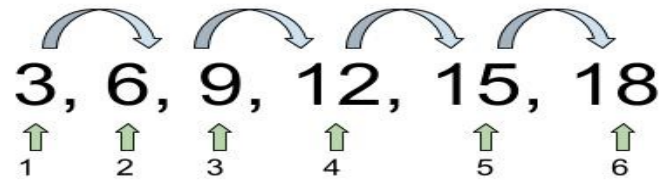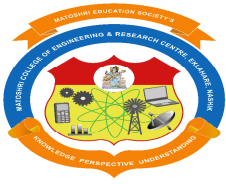

Design Patterns :

A Design Pattern is a blueprint that provides a general solution to the similar type of issues you will encounter over and over in any field of activity.

Mathematics and Patterns:

Mathematics is sometimes called the science of patterns. The most important concept in mathematics is a function. A function is an abstract representation of a pattern. Similarly, every field of activity has patterns.

16

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC
ACCREDITED

Technosavior

3, 6, 9, 12, 15, 18
1 2 3 4 5 6

Patterns are everywhere and are part of our life. We need to tune ourselves to identify and recognize them. The future of humanity depends on pattern recognition. Needless to say, technological advancement depends heavily on adopting old and new patterns.

Which Face Unlocking Technology is Better? Ms. Shiwani Sonawane, TE Computer

The Face unlocking biometric was introduced in 2016 with the Samsung Galaxy Note 7 whereas Apple first introduced Face ID in its iPhone X in 2017.Apple Face ID technology is more promising with its accuracy and security and also it is based on a 3D facial recognition sensor. It is also capable of scanning the face even in the dark. This sensor consists of 3 parts, the first is the Dot Projector module, in which an infrared dot pattern is made on the face of the user, the second module is the flood illuminator that is responsible to read the infrared patterns and generates a 3D facial map. The third module is an infrared camera that takes an infrared picture of these patterns. These patterns are encrypted and sent to a local Secure Enclave in the CPU of the device to match with the registered face. If a user performs an unsuccessful scan 5 times, the Face ID becomes disabled for 48 hours. Also, Apple has claimed that 1 person out of 10,00,000 is likely to unlock the phone by another person with Face ID while 1 in 50,000 is likely to be in Touch ID. In addition, the Face ID system can easily recognize the face even when wearing makeup, hats, scarves, glasses, and also it can adapt to the age factor of a person.

Conclusion:

Facial recognition technology has been in use for the past few years. With the improvements in security and speed, the technology is evolving slowly to newer heights. The future could move towards free walks through doors so that the technology would detect faces and allow entries automatically.

Some people believe that even today's password and PIN are better and safer than face technology because it is a bit difficult to crack the password. Each authentication method has its own advantages and disadvantages. One place, where facial recognition can stand out from other biometric is online authentication during conferences or video-enabled meetings where mainly face is scanned and authentication is done on a larger scale. The facial recognition still has a long path to ride on.

17

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC
ACCREDITED

Technosavior

5G - Wireless Technologies	*Avhad Dipali Sampat , TE Computer*

The super speed and low latency of 5G technology leaves little to the imagination, and dreamers salivate at its potential. At the same time, the breakthroughs have also spawned a slew of conspiracy theories with little connection to reality. In telecommunications, 5G is the fifth generation technology standard for broadband cellular networks, which cellular phone companies began deploying worldwide in 2019, and is the planned successor to the 4G networks which provide connectivity to most current cell phones. 5G networks are predicted to have more than 1.7 billion subscribers worldwide by 2025, according to the GSM Association.On May 12, 2013, Samsung Electronics stated that they had developed a "5G" system. The core technology has a maximum speed of tens of Gbit/s (gigabits per second). In testing, the transfer speeds for the "5G" network sent data at 1.056 Gbit/s to a distance of up to 2 kilometers with the use of an 8*8 MIMO.5G is based on OFDM (Orthogonal frequency-division multiplexing), a method of modulating a digital signal across several different channels to reduce interference. 5G uses 5G NR air interface alongside OFDM principles. 5G also uses wider bandwidth technologies such as sub-6 GHz and mmWave.

5G networks are digital cellular networks, in which the service area covered by providers is divided into small geographical areas called cells. Analog signals representing sounds and images are digitized in the telephone, converted by an analog-to-digital converter and transmitted as a stream of bits. All the 5G wireless devices in a cell communicate by radio waves with a local antenna array and low power automated transceiver (transmitter and receiver) in the cell, over frequency channels assigned by the transceiver from a pool of frequencies that are reused in other cells. The local antennas are connected with the telephone network and the Internet by a high-bandwidth optical fiber or wireless backhaul connection. As in other cell networks, a mobile device crossing from one cell to another is automatically "handed off" seamlessly to the new cell. 5G can support up to a million devices per square kilometer, while 4G supports only up to 100,000 devices per square kilometer. The new 5G wireless devices also have 4G LTE capability, as the new networks use 4G for initially establishing the

18

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC
ACCREDITED

Technosavior

connection with the cell, as well as in locations where 5G access is not available. Several network operators use millimeter waves for additional capacity, as well as higher throughput. Millimeter waves have a shorter range than microwaves, therefore the cells are limited to a smaller size. Millimeter waves also have more trouble passing through building walls. Millimeter wave antennas are smaller than the large antennas used in previous cellular networks. Some are only a few inches (several centimeters) long. Massive MIMO (multiple-input multiple-output) was deployed in 4G as early as 2016 and typically used 32 to 128 small antennas at each cell. In the right frequencies and configuration, it can increase performance from 4 to 10 times. Multiple bit streams of data are transmitted simultaneously. In a technique called beam forming, the base station computer will continuously calculate the best route for radio waves to reach each wireless device and will organize multiple antennas to work together as phased arrays to create beams of millimeter waves to reach the device. 5G networks are cellular networks, in which the service area is divided into small geographical areas called cells. All 5G wireless devices in a cell are connected to the Internet and telephone network by radio waves through a local antenna in the cell.The scientific consensus is that 5G technology is safe. Misunderstanding of 5G technology has given rise to conspiracy theories claiming it has an adverse effect on human health.

The PN Junction as a Rectifier

Mr. Shinde C. R. (Faculty Electrical Engineering Department), June 2019.

Learn about the traits of the rectifying p-n junctions in semiconductors. The fundamental electrical characteristic of a P-N junction is that it facilitates the flow of charge in one direction while restraining the flow in the opposite direction, establishing a rectifying action. Initially, the vacuum tube diodes performed the rectification operations. But the P-N junctions replaced them.

The P-N Rectifying Junction

The P-N junction is a rectifier diode because it has asymmetric current/voltage characteristics, allowing the current to flow in only one direction. An example is the conversion of an alternating current into a direct current Figure 1 shows the I-V characteristic for a silicon P-N junction.
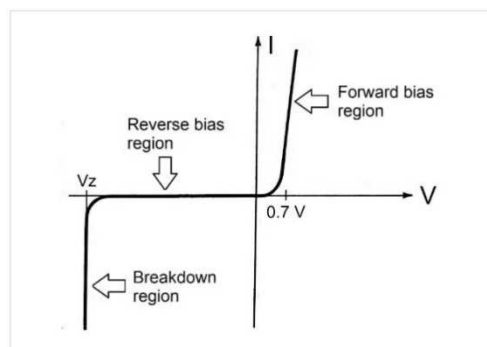

Figure 1. I-V characteristic for a silicon p-n junction.

19

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC
ACCREDITED

Technosavior

The P-N Junction with Reverse Bias

Reverse bias occurs when connecting the negative terminal of a battery (DC) to the P-type side and the positive terminal to the N-type side of the P-N junction – making the N-type side more positive than the P-type side. Figure 2 shows the reaction of the charge carriers to the application of a reverse-biased potential.
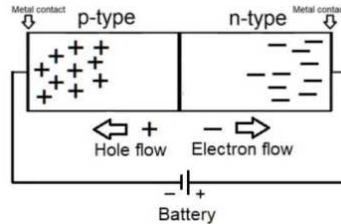
Figure 2. Electron and hole distribution for reverse bias.

The connection polarity causes the holes in the P-type side and the electrons in the N-type side to move away from the junction, separating the positive and negative charges – polarization – and making a larger region around the junction free of mobile charge carriers.The region of negative charge further spreads to the junction's left, and the area of positive charge further expands to the junction's right.

In reality, small current flows due to the small quantity of hole-electron pairs generated throughout the crystal by thermal energy. The holes formed in the N-type side and the electrons created in the P-type side will wander over to the junction. This process generates the reverse saturation current (IS), which increases with temperature and is independent of the reverse bias's magnitude. Consequently, the reverse resistance of the junction decreases with increasing temperature.The reverse saturation current is in the order of a few µA and usually in nA, excluding high-power devices. It attains its maximum level quickly and does not change significantly with increases in the reverse-bias potential – this is why the term saturation is due.Another way of explaining the mechanism of conduction in the reverse direction is considering the potential barrier across the junction with no voltage applied (V0) and the impact of using a reverse-biased potential V.The N-type side will increase the number of uncovered positive ions in the depletion region due to the large number of free electrons drawn to the battery's positive terminal. The P-type side will increase the number of uncovered negative ions in the depletion region due to the large number of holes drawn to the battery's negative terminal. The result is the widening of the depletion region and a higher barrier for the majority carriers to overcome. The reverse bias potential adds to the barrier voltage, increasing the effective barrier voltage to V0+V.The increased barrier's height reduces the majority carriers' flow, the number of holes diffusing into the n-type side, and the number of electrons diffusing into the P-type side. The additional barrier height does not influence the minority carriers' flow – electrons in the P-type side and holes in the n-type side – since they fall down the hill.To summarize, there is a considerable reduction of the diffusion current

20

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC
ACCREDITED

Technosavior

Id. A reverse bias voltage around one volt is sufficient to cancel Id. Then, the current through the junction and the external circuit will be the current Is. Recalling that this is the current due to the drift of the minority carriers – thermally generated – across the depletion region, IS will be very small and deeply dependent on temperature.Figure 3 shows the rectifier (diode) symbol with the reverse saturation current's direction, and the left-hand half of figure 1 shows the volt-ampere characteristic under the reverse-biased condition.
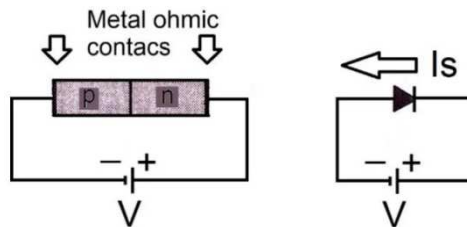
Figure 3. Reverse bias polarity and direction of Is.

The P-N Junction with Forward Bias

Forward bias occurs when connecting the positive terminal of a battery to the P-type side and the negative terminal to the N-type side of the P-N junction – making the P-type side more positive than the N-type side. Figure 4 shows the reaction of the charge carriers to the application of a forward-biased potential.
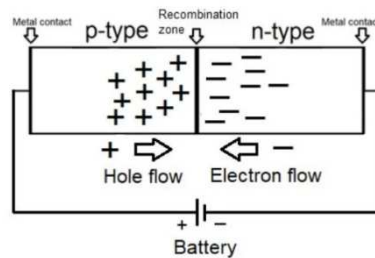

Figure 4. Electron and hole distribution for forward bias.

The battery's positive terminal repels the holes while the negative terminal repels the electrons. Then, the majority carriers, electrons on the N-type side, and holes on the P-type side travel to the junction. As holes and electrons meet, they recombine, extinguishing one another. This process reduces the depletion region's width, generating a majority carrier's heavy flow across the junction.

The applied forward voltage V disturbs the equilibrium initially established between the forces tending to produce majority carriers' diffusion and the restraining influence of the potential energy barrier at the junction. The forward voltage lowers the height of the potential barrier at the junction leading to a barrier voltage of V0−V across the depletion region.

The lower barrier voltage enables more holes to diffuse from the P-type side to the N-type side and more electrons to diffuse from the N-type side to the P-type side. The large number of charge carriers

21

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

Technosavior

flowing across the semiconductor toward the junction produces a low resistance and an appreciable current. Hence, the diffusion current Id increases substantially.

The magnitude of the minority carrier flow – electrons from the p-type side to the n-type side and holes from the n-type side to the p-type side – does not change. Then, Id becomes many orders of magnitude larger than the reverse saturation current Is.

The current Id flows in the forward direction of the junction, as shown in figure 5.
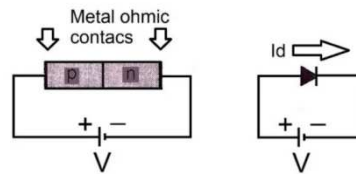
Figure 5. Forward bias polarity and direction of Id.

Siemens gamesa announces the launch of its next generation wind turbine
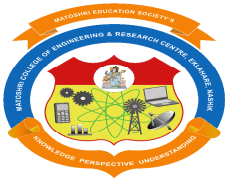*Mr. Bhise D. R.*

Siemens Gamesa Renewable Energy to introduce its next-generation wind turbine, the SG 3.4-145. The new wind turbine is specifically designed and optimized for wind conditions in the country and has a clear objective to deliver the lowest possible Levelized Cost of Energy (LCoE) with high reliability. The turbine is strongly positioned to cater to the needs of the auction market and aims to further drive the growth of wind power in India.

Alfonso Faubel, CEO, Siemens Gamesa onshore said: "The Indian market is evolving fast and so adapting to the new market dynamics is key to our success and long-term competitiveness. The SG 3.4-145 – an incremental innovation, is a step forward in that direction. The long-term fundamentals of the wind industry remain strong and this new turbine means Siemens Gamesa is uniquely positioned to help our customers achieve their renewable energy goals, reinforce our leading position in the market and accelerate the cause for renewable."

The new wind turbine is an extension of the Siemens Gamesa 3.X platform, of which the company has installed more than 3GW globally, and will be manufactured in its facilities in India starting in early 2021. The new model has been upgraded with the 145-meter rotor of the Siemens Gamesa 4.X platform thanks to its modularity, increasing the swept area by 41% and the AEP by 48%, compared to the previous SG 2.2-122.

The SG 3.4-145 stands 127.5m tall, with a blade-tip height of 200m, which helps it to maximize wind potential at every site. Furthermore, the turbine is designed to adapt to India's extreme and varying weather conditions supported by an advanced monitoring and cooling system, which ensures efficient thermal conditioning and performance at high-temperature sites.

22

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

Navin Dewaji, CEO for India, Siemens Gamesa added: " The launch of the new SG 3.4-145 wind turbine is an important element in our strategy, and we are confident that it is entering the Indian market at the right time to bring enhanced value for our customers in this competitive environment. With a robust product in hand and a dedicated team in place, we are strongly positioned to serve their needs amidst the dynamic market conditions."

Dissolved Gas Analysis in Transformer using Three Gas Ratio Method and Fuzzy Logic based on IEC Standard   Ms. Jane K.C.

Dissolved Gas Analysis (DGA) [1-4] of insulation oil in an oil insulated transformer is one of the most useful techniques for the detection of the incipient faults. The various methods, such as Gas key method, Ratios method, Graphical representation method are well known to interpret DGA results. When more than one fault exists in a transformer, these methods sometimes fail to diagnose. IEC Three Ratio Method is widely used, but in many cases this method can not accurately diagnose (such as no matching, multiple faults). This paper proposes a Fuzzy Three RatioMethod; it is considered that the drawbacks of the Conventional Three Ratio Method lie in: when the ratio crosses the coding boundary, codes change sharply, but in reality the boundary should be fuzzied. This paper first propose the fuzzy membership functions for codes "zero", "one", "two", then it transfer the conventional logic "AND" and "OR" used in IEC three-ratio method into fuzzy logic and put forward the diagnosing steps of this method. MATLAB based scripts prove that the proposed method can overcome the drawbacks of the Conventional Three Ratio Method that cannot diagnose multi-fault and no matching codes for diagnosis. In this paper a Fuzzy Logic based approach which can diagnose multiple faults is presented.

INTRODUCTION

The power system starts with generation, by which electrical energy is produced in the power plant and then transformed in the power station to high-voltage electrical energy that is more suitable for efficient long-distance transportation. High-Voltage (HV) power lines in the transmission portion of the electric power system efficiently transport electrical energy over long distances to the consumption locations. Transformers are an essential part of any electrical system. When there is an overheating inside a transformer, it will produce corresponding characteristic gas in the transformer oil, so dissolved gas in oil analysis (DGA) is most commonly used method to diagnose power transformer faults. Among DGA methods, the most commonly used is conventional IEC three ratio method. But this method cannot offer accurate diagnosis for all the faults. Through the combination of fuzzy logic and IEC three ratio method, this paper put forward fuzzy three ratio method. Simulation proves the

23

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

proposed method can overcome the drawbacks of the conventional IEC three ratio methods. Thus, it greatlyenhanced diagnosing accuracy

DISSOLVED GAS ANALYSIS IN TRANSFORMER OIL

Transformer is an important component of electricity transmission and distribution. For reliable electricity supply it is necessary to give considerable attention to the maintenance of transformers. To maximize the lifetime and efficiency of transformers, it is important to be aware of possible faults that may occur on the transformer. These faults can lead to the thermal degradation of the oil and paper insulation in thetransformer. The composition and quantity of the gases generated depend on the types and severity of the faults, and regular monitoring and maintenance can make it possible to detect incipient flaws before damage occurs.

The four main types of transformer faults areArcing or high current breakdown,

- Low energy sparking,
- partial discharges,
- Localized overheating, or hot spots, and
- General overheating due to inadequate cooling orsustained overloading.

The regular monitoring of dissolved gases can provide useful information about the condition of the transformer and prior information of the faults.
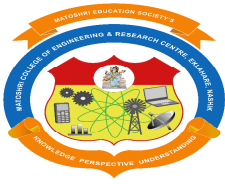
A. Dissolved Gas Analysis (DGA)

Dissolved gas analysis[6] is a test used as a diagnostic andmaintenance tool for oil-filled apparatus. Under normal conditions, the oil present in a transformer will not decompose at a faster rate. However, thermal and electrical faults can increase the rate of decomposition of the dielectric fluid, as well as the solid insulation. Gases produced by this process are of low molecular weight and include hydrogen, methane, ethane, acetylene, carbon monoxide, and carbon dioxide, and these gases get dissolved in the oil. Abnormal conditions in a transformer can be detected early by analyzing the gases that get evolved within it. Analyzing the specific proportions of each gas helps in identifying faults. Faults detected in this waymay include processes such as corona, sparking, overheating, and arcing. If the right preventive measures are taken early in the detection of these gases, damage to equipment can be minimized. Although various techniques are available for maintenance and fault diagnosis in power transformers, DGA is far superior to all other methods because it provides very useful data on the electrical and thermal abnormalities within transformers in operation. Most of the faults of a transformer can easily be interpreted by DGA from the collected oil sample.

IMPLEMENTATION

Conventional Three Gas Ratio and Fuzzy Logic based Fuzzy Three Gas Ratio methods are studied and implemented using MATLAB application software

A. Conventional Three Gas Ratio Method

24

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC
ACCREDITED

Technosavior

In dissolved gas analysis, the IEC codes have been used for several decades and considerable experience accumulated throughout the world to diagnose incipient faults in transformers. Codes are then allocated according to the value obtained for each ratio and the corresponding fault characterized.

The diagnosing steps based on Conventional Three Ratio Method.

Step-1: From the DGA report of the input oil sample, provide the values of concentration of different gases like Hydrogen (H2), Methane (CH4), Ethane (C2H6), Ethylene (C2H4), and Acetylene (C2H2) in ppm.

Step-2: Calculate three ratios R1 = Acetylene (C2H2) / Ethylene (C2H4), R2 = Methane (CH4) / Hydrogen (H2), and R3 = Ethylene (C2H4) / Ethane (C2H6).

Step-3: According to Table 2, each ratio is quantized to a classification code 0, 1, or 2.

Step-4: For the conventional logic IEC diagnosis "AND" and "OR" based conditional statements are constructed for decision making with reference to Table 3, and the fault type out of the 9 listed faults is determined [4].

Step-5: For any non-decision diagnosis, tenth decision of „Not diagnosable" is used.

Step-6: Results are displayed in graph window for gas content in ppm, respective IEC code and IEC based Conventional Three Ratio Method decision.

B. Fuzzy Three Gas Ratio Method

The combination of fuzzy logic and IEC Three Ratio method, this project puts forward Fuzzy Three Ratio Method. It fuzzifies the coding boundary, thus overcomes the drawbacks of coding boundary sharp changing.

1. The fuzzification of the three-ratios

Three gas ratios, R1 = Acetylene (C2H2) / Ethylene (C2H4), R2 = Methane (CH4) / Hydrogen (H2), and R3 = Ethylene (C2H4) / Ethane (C2H6); can be coded as 0, 1, and 2 for different ranges of ratios.

According to Table 3, specific codes of three gas ratios correspond to specific fault. For instance when transformer is diagnosed as no.8 fault, R1 =0, R2 = 2, and R3 = 1. In the IEC code diagnosis, actually the conventional logic AND and OR are used. For example: R1 = 0 AND R2 = 2 AND R3 = 1, through conventional logic operation, will be either one (true) or zero (false).

This method holds that the drawback of the conventional IEC method lie in that when gas ratio change across coding boundary, the code change sharply between 0, 1, and 2. In fact, the gas ratio boundary should not be clear (i.e. fuzzy).

In this method, IEC codes 0, 1, 2 are replaced by fuzzy sets ZERO, ONE, TWO, each gas ratio can be represented by a fuzzy vector [μ ZERO (R), μ ONE (R), μ TWO (R)], where μ ZERO (R), μ ONE (R), μ TWO (R)are the membership function of the fuzzy set ZERO, ONE, TWO.

25

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

Technosavior

In the following, R1 is taken as an example to explain how to transfer IEC codes 0, 1, 2 into fuzzy set ZERO, ONE, and TWO. [4]

The membership function of fuzzy set ZERO is:

$\mu\ ZERO\ (R1)\ =1 \qquad\qquad R1 \leq 0.08$

The membership function of fuzzy set ONE is: $\mu\ ONE\ (R1)\ =0\ \ R1 \leq 0.08$

The membership function of fuzzy set TWO is: $\mu\ TWO\ (R1) = 0\ R1 \leq 2.85$

Similarly, the three fuzzy membership functions for R2 can be obtained as follows:

The membership function of fuzzy set ZERO is: $\mu\ ZERO\ (R2) = 0 R2 \leq 0.08$

The membership function of fuzzy set ONE is: $\mu\ ONE\ (R2) = 1\ \ R2 \leq 0.08$

The membership function of fuzzy set TWO is: $\mu\ TWO\ (R2) = 0\ R2 \leq 0.85$

Similarly, the three fuzzy membership functions for R3 can be obtained as follows:

The membership function of fuzzy set ZERO is: $\mu\ ZERO\ (R3)= 1\ R3 \leq 0.85$

The membership function of fuzzy set ONE is: $\mu\ ONE\ (R3) = 0 \qquad R3 \leq 0.9$

The membership function of fuzzy set TWO is: $\mu\ TWO\ (R3) = 0 \quad R3 \leq 2.85$

The diagnosing steps based on Fuzzy Three Ratio Method

Step-1: From the DGA report of the input oil sample, provide the values of concentration of different gases like Hydrogen (H2), Methane (CH4), Ethane (C2H6), Ethylene (C2H4) and Acetylene (C2H2) in ppm.

Step-2: Calculate three ratios R1,R2 ,R3.

Step-3: Calculate the three fuzzy membership functions of each ratio based on equations listed in section III.

Step-4: As for the conventional logic "AND" and "OR" used in the conventional IEC diagnosis, replace "AND" by "min", "OR" by "max", the fuzzy diagnosing vector F(i) where i = 1, 2,…,9 represent ith fault in Table 3 is determined by the following equations:[4][1]

F (1) = min [μ ZERO (R1), μ ZERO (R2),μ ZERO (R3)]

F (2) = min [μ ZERO (R1), μ ONE (R2),μ ZERO (R3)]

F (3) = min[μ ONE (R1), μ ONE (R2), μ ZERO (R3)]

F (4) = max (min [μ ONE (R1), μ ZERO (R2), μ ONE (R3)]

min [μ TWO (R1), μ ZERO (R2), μ ONE (R3)]

min [μ TWO (R1), μ ZERO (R2), μ TWO (R3)])

F (5) = min [μ ONE (R1), μ ZERO (R2), μ TWO (R3)]

F (6) = min [μ ZERO (R1), μ ZERO (R2), μ ONE(R3)]

F (7) = min [μ ZERO (R1), μ TWO (R2), μ ZERO(R3)]

F (8) = min [μ ZERO (R1), μ TWO (R2), μ ONE (R3)]

F (9) = min [μ ZERO (R1), μ TWO (R2), μ TWO (R3)]

26

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

Technosavior

Step-5: Fault type out of the 9 listed faults is determined.

SIMULATION RESULTS

In order to prove the accuracy of the fuzzy three ratio proposed in this paper, 12 samples with actual fault type already known are collected. Simulation is then carried out by using MATLAB. The diagnosing steps are mention in section

III. Simulation results are shown in table 4.From the table 4 it can be seen that among these 12 samples, IEC method has 3 no decision, fails to correctly diagnose 2 multiple fault. From the table 4, we can say that the accuracy of IEC method is about 75%, but the accuracy of fuzzy method is about 91.66% for readings under consideration.

CONCLUSION

The Conventional IEC based Three Ratio Method developed and implemented for different sample cases in this paper using MATLAB application software, and has been successfully used for the diagnosis of several faults in transformers. It has been proved that using the fuzzy diagnosis method, more detailed information about the faults inside a transformer can be obtained in addition to providing enhanced information for the maintenance engineer while remaining faithful to the original method. In addition to determining the fault in transformer, the recommended and the advisable actions are demonstrated in the program for this method. Also, the multiple faults can be diagnosed using this method, while, it may not be possible for any conventional method. This paper puts forward a transformer fault diagnose method based on Fuzzy Three Ratio Method. This method can overcome the drawbacks of the Conventional IEC Three Ratio Method. The programming of fuzzy logic is easy as compared to conventional IEC Three ratio method. Simulation results show the program work well and the accuracy of the fuzzy logic method is much higher than the Conventional IEC Method.

Benefits of HVDC for Agriculture Mr. Bhise D. R.

The distribution system suffers from the problem of low voltage, power theft and high energy losses. The problem of the losses and voltage drop in distribution feeders dependent on each other and varies with the pattern of loading on the feeders. In case of LT lines, efficiency of the electric gadgets is also affecting and breakdown is also very high. Also there is a tendency of unauthorized connections to hook to the LT lines which results in over loading of the transformers and failure of transformer. The loads for agriculture are predominantly pump sets used for irrigation purposes. Normally, in the present distribution network, the 11kV HT line goes to the DTC (Distribution Transformer Centre) and from there lengthy LT lines are drawn to give supply to different installations of irrigation pump set. In case of HVDS, the HT lines are run up to the installation premises and there it is stepped down through a suitable capacity transformer before arranging supply through service main. In high voltage

27

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

Technosavior

distribution system (HVDS), the electricity is distributed to the consumers at higher voltage level (11kV) instead of low voltage (415V). Adoption of HVDS by converting existing low voltage distribution system (LVDS) to HVDS reduces the technical losses appreciably.

In recent decades, different schemes have been proposed to reduce the losses in the distribution system and hence, to increase the efficiency of electric devices and power distribution networks.
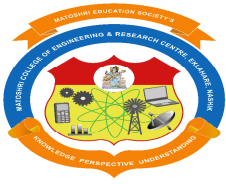
Distribution System

Distribution system with low voltage employs four wires and long low tension lines and multiple loads fed from a bulk power transformer resulting in the increase in system losses affecting voltage profile and performance of distribution system. In existing distribution system, the voltage at buses reduces when moved away from the substation, also the losses are high. The reason for high losses is the use of low voltage for distribution as the current is high in the low voltage system. In the existing system, pilferage is very easy because of lengthy bare LT conductor and thus, many unauthorized connections are tapped from the bare LT conductor which results in over loading of the transformers and failure of the transformers. The prevailing low voltage in the LT line is also affecting the efficiency of the irrigation pump set and breakdown is also very high. Thus, by using high voltage for distribution, we can reduce the losses as current in high voltage distribution system (HVDS) is low. The HVDS employs large three phase 11kV main distribution feeders with three phase lines and three phase distribution transformers transforming 11kV into 415V.

- Unauthorized Connection   ■ - Authorized Connection
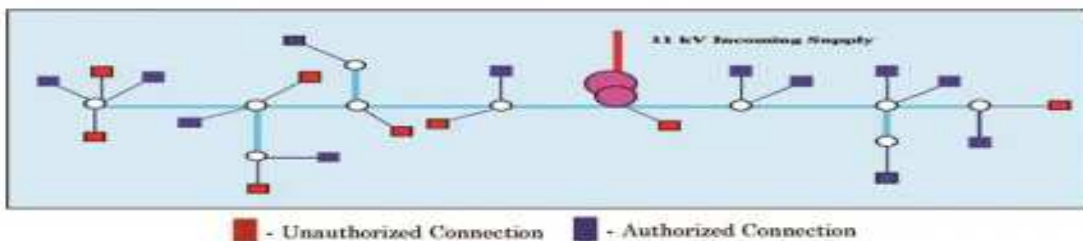
Losses in Distribution Network

Generally, in the process of supplying electricity to the consumers, energy losses occur due to technical and commercial losses. The main reason for high losses is considered to be the use of low voltage for the distribution of power leading to the high current and thus, more resulting in losses. Technical losses include the losses due to the heat dissipation resulting from current passing through conductors, magnetic losses in transformers, resistive losses in windings and the core losses, resistive losses in service line and losses in energy meter. These losses cannot be eliminated but can be reduced. The commercial (non-technical) losses are the losses which include, power theft by hooking the lines, unauthorized connections from the power line, errors in the meter reading or defective meters and in the estimation of unmetered energy supply, loss at the loose connection ends etc. These losses can be eliminated by taking some precautions. And thus, it is necessary to focus on technical losses as well as

28

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

Technosavior

on commercial losses and it can be achieved by using HVDS method for distribution. The various reasons for higher losses in the existing system are:
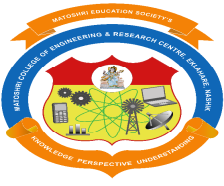
A. Over rated distribution transformers and hence their under utilization.

B. Lengthy distribution lines.

C. Inadequate size of conductors.

D. Low voltage (less than declared voltage) appearing at transformers and consumers terminals.

E. Distribution transformer not located at load center on the secondary distribution system.

F. Low power factor.

G. Poor quality of equipment.

H. Too many stages of transformations.

I. Transformer losses.

J. Bad workmanship.

K. Direct tapping by the non-customers.

L. Pilferage by the existing customers.

M. Defective metering, billing and collection functions.

To reduce the distribution losses, many techniques are developed and some of the loss reduction approaches are listed below:

a) Network reconfiguration and phase load balance

b) Automatic voltage booster

c) Network re-conduct ring

d) Distribution Transformers – Locating and Sizing

e) High efficient Transformer

f) Reactive power compensation

g) Aerial Bunched Cables (ABC)

h) HVDS

High Voltage Distribution System (HVDS)

In the existing system, large capacity transformers are provided at one point and the connections to each load is extended through long LT lines. This long length of LT lines is causing low voltage condition to the majority of the consumers, power theft by hooking the lines, unauthorized connections and high technical losses. To reduce distribution losses, to improve quality of supply and also to prevent theft of electrical energy, high voltage distribution systems (HVDS) are implemented. In HVDS scheme, long length LT lines are converted into 11 kV lines and thereby, installing the appropriate capacity distribution transformer as near as to the end and the supply is provided to the

29

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

Technosavior

consumer. By converting LT lines to HVDS, the current flowing through the lines shall reduce and will bring down the technical losses in the LT line drastically.

The main purpose of using high voltage for distribution is to reduce the theft of energy and decrease in unauthorized connection as the LT lines are virtually eliminated and even short LT lines required will be with insulated aerial bunched cables (ABC). This makes direct tapping very difficult and thus, increases the authorized connection and further faults are totally eliminated which improves the reliability. HVDS is to reconfigure the existing low voltage (LT) network as high voltage distribution system. Each 11kV feeder which emanates from the 33kV substation branches further into several subsidiary 11kV feeders to carry power close to the load points (irrigation pump sets). At these load points, a transformer of suitable capacity further reduces the voltage from 11kV to 415V to provide Low Tension (LT) line to individual customers, either at 240V as single-phase supply or at 415V as three- phase supply.
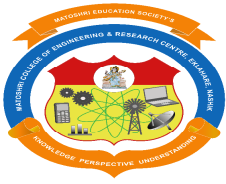
In irrigation, HVDS provides availability of good quality of motors improving pump set efficiency and providing high yield of water. On each distribution transformer, only two or three pump sets are connected and the problem of frequent failure of power due to failure of distribution transformer will be reduced considerably.

Figure 1 illustrates that only 12 consumers (blue color) are authorized; remaining 8 consumers (red color) have unauthorized connections leading to the theft of the power and are making all the consumers to suffer from low voltages and transformer overloading.

Effective implementation of HVDS scheme will have the following benefits:

➢ Reduction in line losses since HV line is taken almost upto consumer load point and on LV side AB cable is used.

➢ Failure of agriculture DTRs are minimized as LT overhead line is avoided and also load per DTR is restricted. Hence, there is no failure on account of over load and LT faults

Reduction of unauthorized agriculture connections, as one small capacity (25KVA) DTR is erected for two or three agriculture consumers. The agriculture consumers will have a feeling of ownership of transformer due to limited connections on it.

➢ As 11kV line is taken almost to the load point, improvement in voltage regulation near agriculture pump sets, resulting in good performance of motor.

➢ Pilferage of electricity is completely avoided as LT AB cable is used from DTR LV upto consumer pump set.

In high voltage distribution system, the authorized consumers do not allow unauthorized tapping by another as their transformer gets overloaded or may get damaged, resulting in outage of power supply for longer durations. The use of HVDS results in reduction in losses and hence, improves quality of supply.

30

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).
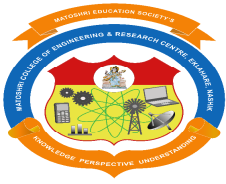
Technosavior

Conclusion

  Implementation of high voltage distribution system (HVDS) for agriculture consumers will result in reduction in losses, increase in energy saving and improve voltage profile. The adoption of HVDS makes the system more reliable and thus, reduces the number of outages. The chances of unauthorized connections and theft of energy are reduced. The restructuring of existing low voltage distribution system (LVDS) as HVDS in agricultural sector presents one of the best technically feasible and financially viable method for providing reliable and quality supply to agriculture consumers.

Power Quality Improvement for Single-ended Primary-inductor Converter Fed Induction Motor Drive : Swapnil Warule ME Second year (Power System)

In recent years the fast growth in power semiconductor devices is increased a wideseries of applications such as robotics, automation, industrial and several others including high and low power applications. Major industries uses induction motor for AC drives application due to attractive features like rugged, reliable, and relatively economical. Industrial requirement are either constant speed or variable speed for operation. Various power converters emerged as a key factor in industrial Drives to maintain speed regulation and reduction of THD for high power- medium voltage applications. Conventional diode bridge converters has adverse consequences and supplementary losses such as poor quality of voltage and current due to harmonic content which causes energy losses. A harmonics distortion produced by power converter are becoming a serious concern for reliable operation of the system. To reduce THD content and improve power quality of supply, a new topology of SEPIC converter is recommended with minimum number of switches. This dissertation work involves study of SEPIC converter. In this report single phase ac to dc SEPIC converter and its THD analysis is done. SEPIC converters is designed and simulated in MATLAB software at discontinuous conduction mode (DCM) to investigate their behavior in open loop and closed loop operation by employing voltage follower approach with PI control scheme.

This concludes improvement in power quality at ac mains with lower THD and output voltage regulation with widespread speed control. The simulated results conceals the enhanced performance for SEPIC converter that decreases the THD at ac input mains to attain the power quality improvement.

The power converters are becoming more popular in power electronics, electrical machine drives and power system application for their PFC feature. Generally these are dc to dc converters ,mostly ac to dc converters are being employed by feeding ac supply to DC-DC converters. These converters has

31

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

Technosavior

extensively worked intended for industrial applications , power supplies, hardware circuits for computers, along with the dc to dc alteration scheme has developed very rapidly.

The dc conversion is achieved by electronic switching circuitry not by electromagnetic one as like usual transformers. These converters having output voltage range from 1V to 10 kV The assortment for topology of dc to dc converters is done by input/output voltages, that can be moreover accustomed along with turns ratio in lonely converters, as well as by power, stress on voltage and current of semiconductor devices, and employment with magnetic component. Converter circuitries are building blocks for disseminated power systems that includes a dc voltage converted to a variety of additional voltages as per necessities of desired loads. These distributed dc schemes are frequently employed in space applications, propulsion and aviations , as well as in telecommunication utensils.
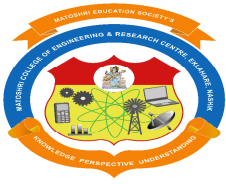
Analysis of Superconducting Fault Current Limitersfor Multi-terminal DC Grid Applications" Author : Mr . Sachin Jadhav ME Second Year (Power System)

At hand a regular growth in electric powered strength calls for in the course of the world. To add-up to this there's greater prominence on employment of renewable source assets speci_cally growing cognizance on o_shore wind applications. The meshed multi-terminal DC transmission (MTDC) device has come to be a thrilling choice because of voltage supply converters (VSC). The MTDC structures had been foreseed to soothen the interconnection of diverse countrywide grids and far ung strength resources.

There are numerous demanding situations that want to be embarked upon earlier than the MTDC structures are bodily realized [3]. A predominant mission is the safety of the MTDC structures in the course of faults and contemporary interruption. The study tries to cope with an issue of the fault research in MTDC structures with SCFCLs.

1.1 Background

The blessings of HVDC transmission over the AC transmission come to be realistic whilst huge power is transported over very lengthy distances. The MTDC structures had been suggested and constructed with the line-commutated converters (LCC) nonetheless, the utilization turned into limited because of want for voltage polarity hitch whilst the strength course distorted. The improvements in semiconductor regions and the improvement of fresh topologies for VSC converters have directed the investigators and coverage makers to consider the meshed MTDC structures. An MTDC device is likewise advised for wind interconnection projects . There is vast discussion inside CIGRE body on the MTDC structures beginning with practicability investigations to improvement of converter models [10]. A MTDC take a look at device is supplied in. An review of the CIGRE sports associated with MTDC device is given. . The components associated with safety of the meshed HVDC structures had

32

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
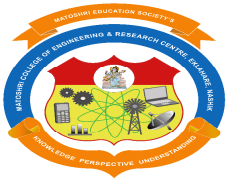**Recognition of 2(F)/12(B) from University Grant Commission (UGC).**

Technosavior

been scrutinized and consequences had been supplied in [3]. At gift the procedural necessities for switching gadgets in MTDC is scrutinized via way of means of a Joint Working Group (JWG A3/B4). The safety of MTDC structures in the course of dc faults is a_rst-rate mission in cognizance of the MTDC structures. From the factor of view of device maneuver the dc faults are anticipated to be intervallic and remote via way of means of device at the dc aspect. Since, if the faults are interrupted via way of means of the ac aspect device then complete device may be close down with opportunity of a blackout. It is famous that dc contemporary interruption is in particular tough because of no-lifestyles of contemporary zeros. The SC currents and safety in MTDC structures had been scrutinized. The dc fault contemporary is proven to growth to a huge fee if the fault persists. A huge signi_cance preliminary discharge because of the terminal and cable/ transmission line capacitances is found in dc fault currents. It is likewise diagnosed that the dc voltage is probable to crumble hastily because of low dc resistance volumes of the lines and transmission wire [17], . The dc circuit breakers are anticipated to break the fault contemporary and recuperate absolute remoteness capacities in a totally quick time to save you voltage crumble. A common time length as pronounced with inside the literature is set 35ms. This requirement implies very rapid performing circuit breakers that may bring about excessive breaker layout necessities. In a relatively current improvement

a hybrid circuit (aggregate semiconductor and electromechanical) has anticipated to be a commercially answer [19]. A feasible method to arrest the speedy growth in fault contemporary fee and save you voltage crumble of the dc device will be performed via way of means of the usage of resistive fault contemporary limiters (FCL). The use of FCL will restrict the fault contemporary and o_er extra resistance with inside the device to put of the voltage crumble. An answer on this identi_ed has been anticipated via way of means of with exercise of contemporary restricting of CLR and SCFCL in. It is proven that the CLR proven limits the fault contemporary and delays voltage crumble of the dc device. In current periodicals [20], [21], [22] use of SCFCL for VSC primarily based totally structures had been supplied however specializes in terminal structures and does now no longer examine the preliminary resistance in addition to the impact of important currents at the capacitor discharge. This study reviews at the feasible use of SCFCL in MTDC structures and their helpfulness in restricting the fault contemporary is tested with model of a 6-terminal MTDC device. The components associated with sizing and the place of the SCFCL with recognizes to fault contemporary diminution. The study additionally addresses the di_culty of place of the SCFCL in an MTDC device with the goal of hindrance of voltage crumble.

The study report is structured as tagged along. Segment II shows the meshed 3-T MMC-HVDC structure with the scheme arrangement, the direction approach of the MMC at every contact and a corresponding DC power ow examination. Segment III commences the meshed MTDC structure with the _tting of a DC-CFC all along with the formation of the DC-CFC. Segment IV elucidates the
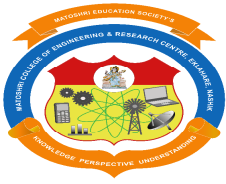
33

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

Technosavior

projected direction approach of the DC-CFC and features with the projected managing system. Case studies and investigation are accessible in sector V, trailed by conclusions drawn in Section VI. The HVDC transmission era is diagnosed as a nice technique for global long- distance bulk-strength rollouts with numerous HVDC programs presently in ex-ercise for MTDC machinery. Few areas, at current, have multi-terminal HVDC grids in function. Owing to its dominance in superuous productively using and integrating renewable power placed in faraway areas, MTDC era has emerge as extra appealing in latest years in comparison to standard factor-to-factor HVDCs . The MTDC device also can be reconstituted into incomparable topologies below faults, par- ticularly following a faulted line is in accessed, and for you to growth the permanence and dependability of the power delivery Concerning the MTDC era, principally, the VSC primarily based totally era has extra bene_ts over the LCC primarily based totally era.

This is due to the fact the vector controls of the VSC converters, which appre- hends the unbiased manipulate of energetic and reactive strength. Hence, for the law of strength, the VSC primarily based totally MTDC device is taken into consideration extra exible, speci_cally in times wherein the strength glide reversal may be without difficulty performed via way of means of invalidating the course of DC currents as opposed to the reversal of DC voltages. Supported on those distinctiveness, MTDC programs are being an increasing number of utilized in HVDC transmission. Radial interconnections of DC grids, meticulously, are individually predomiantly taken into consideration because of their easy con_guration and manipulate techniques for amendable strength distribution. In a radial topology, there may be best one course among electric powered nodes, so the strength is completely regulated. Although the radial topology is straightforward and clean to realize, the meshed topology of DC grids, much like that of AC grids, is taken into consideration as extra favorable for actual strength programs. This is due to the fact the webbed topology will amplify the idleness of power transmission, which throws in to the augmentation of the steadfastness of the strength device transmission. In a meshed DC grid, the overall power swap over on the converter DC facet may be completely controlled; however, the DC present day of every department, relying at the voltage distinction of DC terminals and the resistance of the DC department, won't be controllable. If there may be no extra manipulate method to stability the department currents, the distribution of department currents might be decided via way of means of Kirchho_'s laws. There is a budding vulnerability that at least one parts of a DC grid may get over- burden, while di_erent branches might be misoperated, since more ows will characteristically be conveyed to the part of lower obstruction. In this manner, the unpredictability of the _t DC framework prompts the expected issues, which are the fundamental worries of this study. There are a few control techniques for _t MTDC frameworks that have

been projected in the inscription, distinctive hang regulators have been ex- amined for MTDC frameworks including _t geographies. It was discovered that while the dynamic intensity of every

34

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).
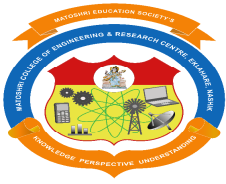
NAAC ACCREDITED

Technosavior

terminal could be composed to a limited degree, the dissemination of the DC current on each division was unequipped for being precisely controlled in the _t matrix. A power ow management device for a coincided DC grid has been planned and shown in In this work, the DC branch current is all around constrained by turning on the inconsistent obstruction of the device. In any case, the problem arises because of switch-in opposition gives unfortunate result.

Soil Health Diagnosis for Agriculture

Sonawane Shubham Jagdish,Jadhav Nalin Ashok,Jadhav Pooja Vijay
Kamankar Pratiksha Sunil

Agriculture is considered as the basis of life for the human species as it is the main source of food grains and other raw materials. It plays vital role in the growth of country's economy. It also provides large sample employment opportunities to the people. Growth in agricultural sector is necessary for the development of economic condition of the country. Unfortunately, many farmers still use the traditional methods of farming which results in low yielding of crops and fruits. But wherever automation had been implemented and human beings had been replaced by automatic machineries, the yield has been improved. Issues concerning agriculture have been always hindering the development of the country. The only solution to this problem is smart agriculture by modernizing the current traditional methods of agriculture. The proposed a system which is useful in monitoring the field data as well as controlling the field operations which provides the flexibility.Generally, the agriculture telemonitoring domain does not contain all necessary hardware and software parts, such as sensors, remote telemetry units, data collection gateway, a server with Disease Management and Irrigation Management software extensions, secure actuating. Communication within the network, as well as with the outside world, is based on heterogeneous protocols that are not entirely Internet-based so that cooperation between different stakeholders involved in agriculture management and precision farming is not straightforward.

Remote monitoring and control (MC) systems combine both wireless and cabled sensors for data gathering and data transport. At the same time, information management systems are designed to store and process the collected data.Internet of Things (loT) is widely used in connecting devices and collecting data information. Internet of Things is used with loT frameworks to handle and interact with data and information. In the system users can register their sensors, create streams of data and process information. loT are applicable in various methodologies of agriculture. Applications of IoT are Smart Cities, Smart Environment, Smart Water, Smart Metering, Security and Emergency, Industrial Control, Smart Agriculture, .Automation, e-Health etc. 'Internet of Things' is based on device which is capable of analyzing the sensed information and then
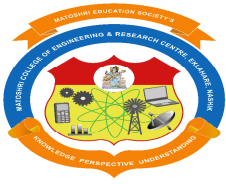
35

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC
ACCREDITED

Technosavior

transmitting it to the user.The current work provides empirical measurement results from in IoT platform based on remote telemetry applications for agriculture.Recent researches hypothetically showed the potential of Internet of Things (loT) to change major industries for a better world, which includes its impact towards the agriculture industry. Farming west, must grasp loT to feed 9.6 billion of global population by **2050.** Challenges such as extreme weather conditions and rising climate change shall be overcome to fulfill the demand for food. Smart farming based on loT technologies will enable growers and farmers to reduce waste and enhance productivity ranging from the quantity of fertilizer utilized to the number of journeys the farm vehicles have made. So. what is smart farming? Smart farming is a capital-intensive and hi-tech system of owing food cleanly and sustainable for the masses. It is the application of modem ICI' (Information and Communication Technologies) into agriculture. In this paper, the hardware and software of the loT for smart farming will be presented besides sharing the successful results. Smart farming is a concept quickly catching on in the agricultural business. loT sensors capable of providing fanners with information about crop yields, rainfall, pest infestation, and soil nutrition are invaluable to production and offer precise data which can be used to improve farming techniques over time. From survey of United Nations— Food and Agriculture Organisations, the world wide food production should be increased by 70sas the world is trending into new technologies and implementations it is a necessary goal to trend up in agricultural.. Many researches are done in the field of agriculture. Most projects signify the use of wireless sensor network collect data from different sensors deployed at various nodes and send it through the wireless protocol. The collected data provide the information about the various environmental factors. Monitoring the environmental factors is not the complete solution to increase th yield of crops. There are number of other factors that decrease the productivity to a greater extent. Hence automation must be implemented in agriculture to overcome these problems. So, in order to provide solution to all such problems, it is necessary to develop an integrated system which will take care dad factors affecting the productivity in every stage.

Hexagonal Shape Microstrip Patch Antenna

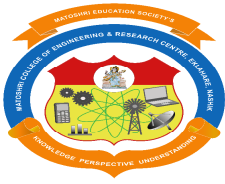*Rajole Mdhuri Vishnu,Rayate Priyanka Sahebrao,Sanap Sanjana Nivrutti*

In this Article a method based on CADFEKO is used to Design and Develop Hexagonal Microstrip Patch Antenna. The aim of this is to Design and fabricate Hexagonal Microstrip Patch Antenna and study the effect of anteana dimensions Length(L). Width(W) and substrate parameters relative dielectric constant (Er) substrate thickness on Radiation parameters of Band width. Low dielectric constant substrates are generally preferred for maximum radiation the conducting patch can take any shape. Microstrip antennas are becoming very popular in the field of WLAN, Wi Max

36

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

Technosavior

RADAR Satellite, and Mobile application. The length of the antenna nearly half wavelength in dielectric: it is a very critical parameter, which governs the resonant frequency of the antenna of the antenna. In view of design, selection of the patch width and length are the major parameters along with the feed line depth desired patch antenna design are initially simulated by using CADFEKO simulator. And patch antenna is realized as per design requirement Communication between humans was first by sound through voice. With the desire for slightly more distance communication came, devices such as drums, then visual methods such as signal flag and smoke signals were used. These optical communication devices of course utilized the light portion of the electromagnetic spectrum. It has boot only very recent in human history that the electromagnetic spectrum, outside the visible region has been employed for communication. through the use of radio. One of the humankind greatest natural resources is the electromagnetic spectrum and the antenna has been instrumental in harnessing this resource. The extensive demand for mobile communication and information transmission leads major achievements in the antenna design. It progressed to fast in recent year it required small supporting multiband communication. The wired communication is not possible for long distance, In that some loss also takes place that is conductor loss. Operating speed is defined by how fast the wave can transmitted and what time required to transmit this wave. Portable antenna" really means transportable antenna one that is moved to some (usually temporary) operating position for use. This puts them in a different class from mobile antennas, which are intended to be used while in motion. Portable antennas come in a wide variety of sizes and shapes. and can be used on any amateur frequency. "Design and Development of Hexagonal Microstrip Patch Antenna for Satellite Application"

These antennas show the importance gain by them. The micro strip antennas are the present day antenna designer's choice. Low dielectric constant substrates are generally preferred for maximum radiation. The conducting patch can take any shape but rectangular and circular configurations are the most commonly used configuration. Other configurations are complex to analyse and require heavy numerical computations a microstrip antenna is characterized by its Length, Width, Input impedance, Gain and Radiation patterns. Various parameters of the microstrip antenna and its design considerations were discussed in the subsequent chapters the length of the antenna is nearly half wavelength in the dielectric: it is a very critical parameter, which governs the resonant frequency of the antenna. There are number of hard and fast rules to find the width of the patch.
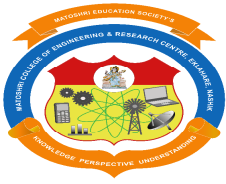
37

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC
ACCREDITED

Technosavior

Automatic Sweeping Robot	*Mansi Patil*
	Reference-www.google.com

In the present day scenario all the members of family are busy with their work and are not getting proper time to clean the house. The cleaning robot helps to clean and mop the floor. This is done by simply pressing a switch and the robot does the work. This also cuts down the labour used in factories for cleaning floor. Above being the case, motivated for the design and development of an automatic cleaning and mopping robot that does all the cleaning and mopping work with a simple press of a button. This robot can be controlled manually with the help of a mobile Bluetooth. The main moto of the project is to make this affordable and suitable for the Indian users and factories. The development of the robot starts with the design of a simple and most effective chassis for the robot which is a very important part as it has to carry all the weight on the robot. The electronics part where, the type of motor and its specification that should be used to run the bot, the sensors to be used, the microcontroller, the motor drivers, the wheels and other electronic components to be used on the robot are decided. Further, the assembling of the components will be done and finally testing and calibrating the device. A robot which is capable of efficient dust cleaning and moping of the floor of a given room is the main aim of the robot. It is aimed to make the robot economic and feasible for the economic class society. The target time of operation of the robot is one hour. The developed robot will be useful for the household application and industries. This helps to keep the workspace and house clean without the physical labour. Also, the device will clean the room with a single switch of button.

Robots are machines which are programmable and are able to carry out complex tasks with minimal human interventions. Robots find applications on many domains, even for household applications. Robots for domestic application have been rising. Vacuum cleaning robots are especially famous. Among various robots present in the world only some robots can be used especially for doing the household chores of man. Among those robots, one special kind of robot that is very useful for everyone is cleaning and mopping robot. A simple automatic robot that uses some prefixed algorithms and programs to clean the specified area is called a cleaning robot. The main use of this robot is to reduce the human interaction in the cleaning process which can be a time taking process. These robots can be used anywhere i.e., in offices, houses, industries etc. These robots can be activated with the press of a single button or can be pre-set to activate at a particular time. There are many successful products in the market. The leading products are IRobot Roomba, Rrimin Smart Vacuum Cleaners Intelligent Automatic Sweeping Clean Robots, Exilient Ready Maid Robotic Vacuum Cleaner and many more. Every product has its own pros and cons. The main problem with these products is they are costly and not much compatible for Indian users. These products are much effective for wooden floor than the tiles. Some products do work for the tiles but this is available in high-end versions only.

38

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

Before the early discussions on the project, a market survey has been done in which a target group of 100 families was consulted and enquired about the cleaning and mopping robots.
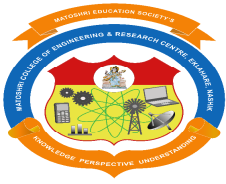
Colour Sensing Robot	Bargal Sainath Vinayak

With the rapid development in robotic technology around the world, many robotic applications were developed to improve our quality of lives. The International Organization for Standardization gives definition of robot is "an automatically controlled, reprogrammable, multipurpose, manipulator programmable in than or more axes which may be either fixed in place or mobile for use in automation applications". In this design, Bluetooth wireless technology is used together with robotic application to demonstrate the effectiveness of unmanned arm robots. Bluetooth is one of the new technologies designed to enable WPAN based around the new standard.

The main aim of the project is to design robot which has better range and camouflaging feature to disguise the surrounding surface. The proposed system consists of colour sensor as part of camouflaging feature. Thus we have constructed a robot which will change its colour according to surrounding surfaces and can be easily hidden from enemies. The colour sensor switches each primary color RGB, one by one and checks what intensity of color is reflected by the surface of detection. This reflected intensity is converted to 8 bit value. For example a RED surface will strongly reflect RED. While a Yellow surface will reflect RED and GREEN both having different values for RED and GREEN colour and combination of than value become yellow colour. According to the induction principle of the three primary colours which create various other colors in nature, once the value of three primary colours is confirmed, the color of the tested object is known. Knowing the value of RGB helps people gain the color of the light which is projected onto the sensor since each color correspond to only one value of RGB.

For the last few decades, unmanned robots-vehicles are becoming very popular and common, Industries home and military organizations. There are many advantages of these robots as compared to human contributing to those application areas. One of the most important things about these robots is that they have the capability to perform their action remotely in the field, where human cannot enter and do the activity without any risks to human lives. This shows a great impact on robots. These robots are expected to be great successful intelligent machines in the risky as well as unmanned critical environment. Bluetooth protocol is widely used in embedded applications such as unmanned multifunctional robot for defence applications. Several leading radio system manufacturers have implemented solutions based on the IEEE detailed Bluetooth protocol as described in literature. Bluetooth controlled terrorist fighting Robot, structural monitoring to track building and bridge integrity. Use of arm robots in medical field for surgery as well as for taking medical tests such as

39

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

Technosavior

NAAC ACCREDITED

colonoscopy. These applications generally require numerous low-cost nodes communicating over multiple hops to cover a large geographical area, and they must operate unattended for years on modest batteries. Such requirements target a very different set of applications than do Wireless Personal Area Network (WPAN) technologies such as Bluetooth, which eliminate wiring for headsets, game controllers, and personal devices. Accordingly, Bluetooth capabilities are more limited than others they have small frame sizes, low bandwidth, and low transmit power.
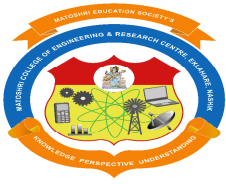
COVID-19 Entrance Security System	Mali Vikas Atmaram

Reference : www.google.com

At for first time, it was discovered in China, but spread quickly to othercontinents in just few weeks. According to report, until July 11th, 2020, the total numbers of identified cases were 12,653,451, while taking 563,517 lives worldwide. From lastyear 2020 the occurrence of novel infectious flu-alike respiratory disease COVID-19caused by SARS-Cov-2 virus has affected almost every aspect of people's lives globally. Common symptoms of coronavirus disease include fever, tiredness, sore throat, nasalcongestion, loss of taste and smell. In most cases, it is transmitted directly personto person, through respiratory droplets, but also indirectly via surfaces. Incubation period could be quite long and varies between 14 and 27 days in extreme cases. Even asymptomatic persons (almost 45persent of cases) can spread the disease making the situation even worse. Therefore, the usage of face masks and sanitizers has shown positive results when it comes to disease spread reduction.

Automatic temperature control system is an important application used in almost all modern gadgets and smart homes. The system for controlling temperature automatically is achieved by using Arduino Uno-based microcontroller system. ArduinoUno due to its increased popularity finds its varied range of applications. Temperature sensor LM35 and Arduino Uno are the hardware used interfaced with computer, and the temperature is controlled in the room. Temperature is displayed on LCD display employing A1 pin of hardware with the help of analog pin utilizing pulse width modulation (PWM). We have designed temperature control as an automatic system that has been not attempted before the way it has been implemented. Mask detection technology uses a Computer Vision algorithm to detect if a person is wearing a face mask while acquiring and analyzing face data before access granted. Besides identifying people wearing masks, security system with this technology ismore expeditious, convenient, and reliable in monitoring mask-wearers and passers-by trying accessing the restricted areas. The solution is exile and easy for people to deploy. In some situations, face masks are mandatory or even recommended. Access control with mask detection is a simple solution to help reduce the risk of getting infected, and also a good reminder to wear masks before entering the

40

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

controlling areas.Sanitizing hands are a must to forestall COVID-19. As squeezing the container spout is unhygienic, there is a need for Auto Sanitizer that will guarantee a legitimate cleanliness and wellbeing in broad daylight spaces which is better solution for industry plants, workplaces, emergency clinics, shopping centers, railroads, shops and homes. Touch-less Completely Programmed sanitizer has been proposed with an in-built Ultrasonic sensor that detects hands when put beneath the gadget and administers the fluid sanitizer. Additionally, the proposed unit provides the required amount of spillage and gets prepared for the next action rapidly within 4seconds of duration.
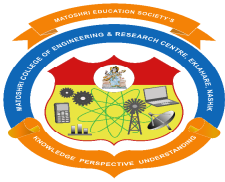
The main components of system are:

1. Temperature Detection.
2. Face Mask Detection.
3. Sanitization Process.
4. Providing of Face Mask.

The rapid spread of the novel coronavirus and its resulting condition, COVID-19,has caught much of the world off-guard. The tragedy has yet to fully play out, but it is already clear that the crisis is thoroughly global in nature and that science is on the front lines in the fight against the virus. This includes medical professionals attempting to heal the sick at risk to their own health, public health officials tracking the virus and vigilantly urging such measures as social distancing to mitigate itsspread, and researchers now engaged in the development of diagnostics, treatments and vaccines.

Match Prediction Matrimonial web Application   -Snehal Kharde (B.E I.T)

Matrimonial Websites are a variation of the standard dating websites. Matrimonial sites are popular in India and it is an alternative to the Traditional Marriage Broker. Matrimonial Services is an application which will provide all Marriage related services and collect all the service providers from all over the India at one platform to help parents looking for marriage to their sons and daughters anywhere in the India. Matrimonial website has similar functionalities like Jeevansathi.com, Bharat matrimony, Shadi.com. It allows user to register his/her profile and search his or her matching profile and supports quick and advance profile search. The drawback of existing systems is it doesn't match the behavior of the Bride/Groom to find out the perfect match. To find out the perfect match and understand the behavior, we proposed a Matrimonial Web Application which uses Machine Learning to understand the user's behavior and suggest real-time appropriate profiles. Searching for a life partner on matrimony sites has become hi-tech now, as the marriage portals are taking the help of artificial intelligence to find and recommend a life partner for their users. Definitely AI and machine learning help to match better. The Gale Shapley Algorithm is used to find stable matching.
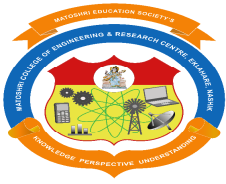
41

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

Smart Changing Room Using Kinect –Pallavi Pagare(T.E I.T)

In recent years, the number of people who buy the clothes on the net shopping has increased. The disadvantage of the net shopping is that you do not get to fit to try the goods. Therefore, many consumers buy clothes that do not fit them. In this work, we hope to create a virtual fitting system to solve the problem. A virtual fitting system require the 3D models of the clothes and the consumer. In the first step, we propose the use of Kinect to capture the physical measurement of consumers and create a 3D CG for them. The problem is simply the alignment of the user and the cloth models with accurate position, scale, rotation and ordering. First, detection of the user and the body parts is one of the main steps of the problem. In literature, several approaches are proposed for body part detection, skeletal tracking and posture estimation, and superimposing it onto a virtual environment in the user interface. Virtual try-on applications make it possible for buyers to watch themselves wearing different garments without physically trying on them. The prevailing approach for virtual try-on has been based on virtual fitting rooms, in which several cameras are used to identify the skeleton and posture of a user in order to render a garment on the user's image. Several quantitative experiments as well as user studies were performed to evaluate the accuracy, efficiency, usefulness, and privacy of the proposed technique.

Enhancing Learning Experienec using Augmented Reality Ashwini Patil (T.E I.T)

Augmented Reality is an emerging technology and the applications of technology are still not fully unveiled. **Augmented reality** (**AR**) is an enhanced version of the real physical world that is achieved through the use of digital visual elements, sound, or other sensory stimuli delivered via technology. It is a growing trend among companies involved in mobile computing and business applications in particular. This system explores a new application of augmented reality for a new direction in educational book publishing, which aims to bring interactive learning experience to life. The project takes printed images on book to the next level by applying Augmented Reality technology to provide a unique fascinating experience to its readers on mobile devices. Augmented Reality (AR) technology composing with animation brings new digital entertainment experience to the reader of books. The key feature of this system uses the technology presents auxiliary information in the field of view of an object printed on book automatically without human intervention. The project uses the technology with iPad mobile device to display 3D models, 3D animations, video splaying, websites and web server connectivity for children education. The results and evaluation of the project shows the interactive 3D animation and self -assessment functions significantly support students to improve their

42

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

learning experience and performance. The software product of this project, from the business perspective, creates a new business marketing dimension in digital publishing and increases the selling profits in the book publication business.
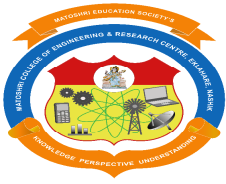
Surplus Food Redistribution and Recommendation Sytsem Using IoT
Rekha Gaidhani (B.E I.T)

First, both the high- and low-calorie estimates indicate that India has a large food-insecure population. Even the best-case scenario suggests nearly 40 percent of India's population is food insecure. Second, the lack of precision in the estimates creates significant uncertainty in the number of food-insecure people.This system proposes an IOT based context aware framework which can capture real-time dynamic requirements of both vendors and consumers and perform real-time match-making based on captured data. The **Internet of Things** (**IoT**) is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction. We describe our proposed reference framework and the notion of smart food sharing containers as enabling technology in our framework. A prototype system demonstrates the feasibility of a proposed approach using a smart container with embedded sensors. The concept and an initial prototype of a Smart Food Container was introduced. Although current focus is on the excess food these can be used to identify the best environment for non-excess food as well as for other resources for donation. Weight, GPS, Air pressure, Light and RFID readers will be added to the Smart Container in the next phase of the implementation. Ultimately these allows real-time, dynamic, intelligent and context-aware match-making between the vendors/food items and consumers.

PDF Extraction Using Data Mining Technique   -Thakur Vrushali (T.E I.T)

In this era, where tremendous information is available on the internet, it is most important to provide the improved mechanism to extract the information quickly and most efficiently. **Data mining** is the process of finding anomalies, patterns and correlations within large **data** sets to predict outcomes. Using a broad range of techniques, you can use this information to increase revenues, cut costs, improve customer relationships, reduce risks and more. It is very difficult for human beings to manually extract the summary of a large documents of text. There are plenty of text material available on the internet. So there is a problem of searching for relevant documents from the number of documents available, and absorbing relevant information from it. In order to solve the above two

43

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

problems, the automatic text summarization is very much necessary. Text summarization is the process of identifying the most important meaningful information in a document or set of related documents and compressing them into a shorter version preserving its overall meanings.

Start-Up, operation & Maintenance of Cooling Tower

Mr. Tushar T. Kapade

Before Start-up

Among other sources, outbreaks ofLeginnaires' disease have reportedlybeen traced to cooling towers,Maintenance and water treatmentprocedures that prevent amplificationand dissemination of Legionella andother airborne bacteria should beformulated and implemented BEFOREsystems are operated and continuedregularly thereafter to avoid the risksickness or death.

CLEANING - New installations shouldbe cleaned and treated with biocides by awater treatment expert before startup.Remove any dirt and trash, which hasaccumulated in the cold-water basin.Remove any sediment from the coldwatercollection basin, sump, and screens.Use a water hose to flush cold-watercollection basins.

OPERATE WATER SYSTEMS –Startthe circulating water pumps. Increase theflow of circulating water gradually tomatch design water flow rate. Circulatewater over the cooling tower continuouslyfor several days before stating themechanical equipment and placing thecooling tower into continuous operation.When starting cooling tower, followprocedures outlined below.

INSPECTION - It is imperative that alloperating assemblies are inspectedbefore they are placed in operation. Thefollowing is a list of components to bechecked before starting the tower:1. Check tightness of bolts in fancylinder joints.

2. Check the following bolted joints inthe fan and drive assemblies

a. Fan hub clamp boltsb. Fen hub cover bolts

3. Rotate fan by hand to be sure of freerotation and ample tip clearance.

4. Check motor insulation with a"Megger".

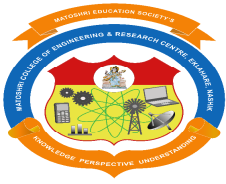5. Lubricate the motor according tomotor manufacturer's instructions.

6. Test run each fan separately for ashort time, Check for excessivevibration or unusual noise.

7. Check functioning of makeup watersupply.

8. Make sure the blow-down carry theproper amount of water.

Starting Procedure

WATER SYSTEM Fill the cold water collection basin andcirculating water system until the
operating level is reached. Prime andstart the circulating water pumps.Increase the flow of circulating watergradually to design water flow rate toavoid water hammer could damage thedistribution piping

44

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC
ACCREDITED

Technosavior

systems.Clean the sump screens several timesduring the first week of operation.After this, clean sump screens weekly.

STARTING FAN

Pitch fans to pull correctcontract horsepower when circulatingdesign water rate at design hot watertemperature.

Operation

Entering water temperature in excess of125 F may result in fill deformation.

TOWER PERFORMANCE

Keep the cooling tower clear and waterdistribution uniform to obtain continuedmaximum cooling capacity. The capacityof a cooling tower to cool water to givecold water temperature varies with thewet-bulb temperature and heat loadapplied to the cooling tower. As the wetblubtemperature linearly with the wetblubtemperature.A cooling tower will not control heat load.The flow rate of water circulated throughthe cooling tower will determine thetemperature range of cooling inconjunction with a given heat load. Thehot water and cold water temperature willincrease with higher heat loads.
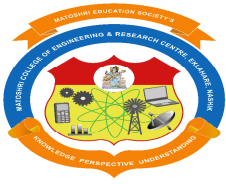
HOT WATER DISTRIBUTION

SYSTEM

Maintain uniform water distribution at thenozzles (uniform spray cone). Theamount of tower circulated shouldapproximate the contract requirementsand the nozzle pressure should be keptconstant. Lower pressure may indicateexcessive losses in the piping system

and/or insufficient pump capacity;greater pressure might indicate cloggednozzles and/or over pumping. If a greatlyreduced water flow rate in desired, it maybe advisable to change nozzle sixes toobtain the desired pressure and maintainproper water distribution. Minimum andmaximum flow rates should be adjusted+20% for even distribution.

COLD WATER COLLECTION BASIN

A suitable depth must be maintained tokeep the pumps from pulling air into theline. The amount of "makeup" waterrequired to keep the water in thecollection basin at the required depthdepends upon the "evaporation loss"and "blow-down"

FAN DRIVE

When using two-speed motors, allow atime delay of 20 seconds minimum afterde-energizing the high-speed windingbefore energizing the low-speedwinding. Tremendous stresses areplaced on driven machinery and motorsunless the motors are allowed to slow tolow-speed RPM or less before the low speedwinding is energized.

45

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC
ACCREDITED

Technosavior

New Horizons in HVAC: Air Quality Products

Mr. Gagan Kamble, BE Mechanical

Johnson Controls India introduced a wide range of air quality products during ACREX 2020.The kitchen scrubber that was on display is UL listed, comes with solid state pulse width modulating power supply and extra deep electrostatic collecting cells with spiked ionizing blades, and features motorized water wash manifolds with spray nozzles in the ESP section. The ceiling/wall mounted air cleaner follows the Coanda airflow model, three speed fan, remote control, indoor air self-circulation and permanent filter. Also on display was the Trion brand ESP fi lter for AHU, FCU and duct applications, capable of capturing≥0.01µ particulate matter, with low resistance, washable andcycle use, sterilizing capability, modular design and small size. The Trion residential air purifieron display uses patented UVC germicidal technology to destroy biological contaminants; reduces or eliminates symptoms of allergies, asthma and other maladies triggered by mold, bacteria and their metabolic products; reduces the spread of infectious diseases caused by bacteria; destroys airborne viruses; removes VOCs through carbon absorption;

uses a high efficiency pleated filter media; and is ozone-free. The Sterilize UV lamp on display kills mold, bacteria and viruses. Dry All Introduces Filter Drier with Leak Detection Technology Dry All has introduced the world's first filter drier with leak detection technology, to pin point the location of refrigerant leaks quickly in HVAC&R systems. This innovation was declared runner pin the Innovative Refrigeration Products category at REFCOLD

India Emerson Awards 2019.The technology involves Tracer Wafer (TW) from Spectroline,USA – small tablets impregnated with a fluorescent dye – inserted in the fi lter drier at the manufacturing stage. The dye moves out of TW when it comes in contact with compressor oil along with the refrigerant, and mixes with the complete oil charge in the system. Later on, if there is a leak, the fluorescent dye in the system will show up at the point of leakage. The dye can be detected at the point of leakage with the help of a UV torch when seen through yellow glasses. This helps the technician to quickly detect the exact point

Trion electronic filter bankTrion air purifier

Of small, multiple and intermittent leaks in any HVAC&R system. This method is cost-effective and requires no special skills. This leak detection technology has been incorporated in the full range of Dry All filter driers, and is also available in core-and shell type of filter driers. It is a highly concentrated powdered alkaline cleaner and degreaser that enables rapid penetration and is able to remove oil, grease and dirt from surfaces. The product is non-flammable and non-corrosive. It does not attack metals like copper and aluminum, and contains rust inhibitors. It can be used on most surfaces that are water safe. It is versatile and no special clothing is required while handling it. It can be used in HVAC and industrial equipment and machinery, to clean walls, concrete floors and equipment. Magna White
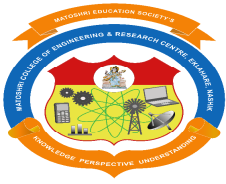
46

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC ACCREDITED

Technosavior

has a pH of 11.5±0.5, bland odor and good stability. It is non-toxic, and works with hard water up to 500 PPM. It needs to be diluted with water in the ratio of 1 kg of powder in 100 liters of water. It may be used at temperatures of up to 85°C. It does not have a flash point. For more details, Pureblu Technologies Launches 'Smart Dealer 'To meet the twin challenges of increasing competition and higher manpower costs, Pureblu Technologies – a start-up that builds technology tools to help small enterprises increase their efficiency in the field of HVAC&R – has developed software that addresses the service challenges of the air-conditioning industry, viz. tracking of customer complaints and their status, updating customer data and handling service reports, AMC tracking and renewals, warranty claims onOEMs, field team productivity, and back end administration dependability.So far, the options available for service management were limited to generic software. 'Smart Dealer' from Pureblu is a cloud based paperless service management software priced on a per technician per month basis. It can be accessed from anywhere,as it is cloud based, and the administrator controls access to the software. It manages customer data with machine and AMCdetails, and tracks technician and back office administration performance. It keeps data secure. It is paperless; service reports are made by technicians on their phone app, and the customer and business owner can access them instantaneously. Machine history is automatically updated. The software sends a daily morning sms update to the owner to let him know what is pending for service.

New Horizons in HVAC: The Need for Solar Decathlon India
Mr. Pratik Patil, Student-BE Mechanical

Extreme weather events due to Climate Change are becoming more frequent and most cities have started experiencing temperatures above 40°C. Meanwhile, energy demand in
India is expected to increase by 1.5 million TWh in the next 30 years and cooling demand in buildings is expected to grow 20-fold in the next 20 years. To limit global warming to 1.5°C,we need to move from using oil and coal to zero-carbon by 2050. Net-zero-energy-buildings(NZEBs) are the building industry's solution for a clean energy transition. They reduce cooling demand and energy consumption, and generate renewable energy. The design strategies and technologies employed in these buildings make them resilient to climate change impacts. Many countries already require NZE performance of buildings, and these regulations go into effect at or before 2030. ASHRAE's vision is aimed at producing market-viable NZEBsby the year 2030. This march to a clean energy future appears inexorable, given the recent changes by large investment fi rms. In January 2020, BlackRock – the biggest asset manager in the world – decided to lower its exposure to the risk of fossil fuels by reallocating capital.JP Morgan and Goldman Sachs have both pledged to rule out future financing of oil drilling and new mines for thermal coal. These are signs of significant change. In the building
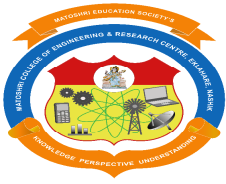
47

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC
ACCREDITED

Technosavior

industry and student body, those who can deliver buildings with net-zero-performance will be the leaders in the near future.Of the 5,00,000 engineers and architects enrolled in building sector courses inIndia, only about 100 can design net-zero-energy buildings as of now. These are the students who have participated in Solar Decathlon competitions held in other countries and achieved energy consumption reductions of 50% or more (see Figure 1). However, participation at a larger scale can only happen when we have an Indian version that addresses local issues and priorities. Solar Decathlon India will combine online education, hands-on problem solving, and mentoring by experts to develop expertise in designing and building net- zero and resilient buildings and provide thermal comfort for all – an urgent social need1. The Solar Decathlon India will demonstrate the workability and affordability of these solutions. It will build on the success of the past Solar Decathlons, which began as a student challenge in the USA and have spread to Europe, China, the Middle East, Africa and Latin America.

Partners and Participants

Solar Decathlon India will be conducted by the Indian Institute for Human Settlements (IIHS) and the Alliance foran Energy Efficient Economy (AEEE) under the aegis of theIndo-US Science and Technology Forum, in collaboration with the US Department of Energy. The challenge is open to all colleges from India and the world over. Interdisciplinary teams will innovate affordable net-zero-energy-water-waste buildings. They will compete and work on real building projects by partnering with a developer/client to propose affordable market-ready solutions. Each team will be guided by a faculty advisor. Developers, real estate companies, manufacturers and professionals can partner with teams and draw benefits from the student exploration and innovations. The students' working the Solar Decathlon India will give the college and faculty member's opportunities to gain recognition as leaders in addressing climate change. The competition will be launched in June 2020, and will run over an entire year..The teams will be provided with online education modules related to building science, energy efficiency, renewable energy, water sufficiency, cost estimation, etc., and access to software and a Technical Resource Group of individuals with experience in net-zero-buildings. In the first stage during the odd semester, the teams will attend the online educational sessions, gather inputs from their Project Partner and define their project approach. A significant level of pre-design analysis is expected during the development of the concepts. The students will submit their work for preliminary reviews in August and November, and thosewho have done the due diligence will be selected for the next stage. The faculty advisors will be invited to a mid-year faculty conference, expected to be held in December. In the second stage during the even semester, the students will develop their design with engineering and construction

details. Calculations, performance simulations, cost estimates and other financial metrics are expected for their evidence based design. The teams will submit their work and present itto a jury of industry

48

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

Matoshri Education Society's
Matoshri College of Engineering and Research Centre, Nashik
Approved by All India Council Of Technical Education (AICTE)
Affiliated to Savitribai Phule Pune University, Pune.
Recognition of 2(F)/12(B) from University Grant Commission (UGC).

NAAC
ACCREDITED

Technosavior

professionals in April. Teams with promising solutions will be selected for a six-week incubation hub in the third stage. The incubation hubs will bring in expert mentors towork with the teams and help them make their solutions market ready by responding to the feedback from the jury and Project Partners.

Ethanol as a Fuel Author: *Mr. Abhinay Borse,* BE Mechanical

Ethanol fuel is ethyl alcohol, the same type of alcohol found in alcoholic beverages, used as fuel. It is most often used as a motor fuel, mainly as a biofuel additive for gasoline. The first production car running entirely on ethanol was the Fiat 147, introduced in 1978 in Brazil by Fiat. Ethanol is commonly made from biomass such as corn or sugarcane.

Production

Although there are various ways ethanol fuel can be produced, the most common way is via fermentation. The basic steps for large-scale production of ethanol are: microbial (yeast) fermentation of sugars, distillation, dehydration, and denaturing (optional).

Fuel mixtures

In many countries cars are mandated to run on mixtures of ethanol. All Brazilian light-duty vehicles are built to operate for an ethanol blend of up to 25% (E25), and since 1993 a federal law requires mixtures between 22% and 25% ethanol, with 25% required as of mid July 2011.[49] In the United States all light-duty vehicles are built to operate normally with an ethanol blend of 10% (E10). At the end of 2010 over 90 percent of all gasoline sold in the U.S. was blended with ethanol.

In June 2021, India brought forward to 2025 its target to implement a 20% ethanol-blended auto fuel. India's ethanol blending rate in fuel (at the time of this target revision) is 8%, which is set to increase to 10% by 2022 based on the 'Roadmap for ethanol blending in India 2020-25' released on 5 June (World Environment Day) by Prime Minister Narendra Modi. India is also prioritizing roll-out of vehicles compatible with ethanol-blended fuel. From March 2021, auto manufacturers are required to indicate the ethanol compatibility of new vehicles and engines must be optimally designed to use 20% ethanol-blended fuel. The government expects automakers to begin production of ethanol-blended fuel compliant vehicles before April 2022. However, environmentalists worry that India's increased target for ethanol blending could incentivise water-intensive crops such as sugarcane and rice, and suggest that the government should focus on lower-water intensity crops such as millets since India is already facing an acute water shortage.

Source of articles is: Wikipedia

49

Matoshri College of Engineering and Research Centre, Nashik
Eklahareshivar, Near Odhagaon, Opp Nashik-Aurangabad Highway, Nashik,
Pin-422105, www.engg.matoshri.edu.in
Contact: 0253 2406600,612

NAAC ACCREDITED

Matoshri College of Engineering & Research Centre, Nashik

Eklahareshivar, Near Odhagaon, Opposite to Nashik-Aurangabad Highway, Nashik, Maharashtra 422105

Website: engg.matoshri.edu.in/Email: matoshricoe.hr@gmail.com
Contact: 0253-2406600/1/2/3
Toll free No.:1800 233 6602